

CAZONEV 90T56

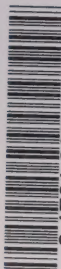
Ontario. NOE.

TORONTO PORT INDUSTRIAL AREA ENVIRONMENTAL ASSESSMENT

STUDY. / Ecopact Assessment Ltd. 1990.

CA2 ONEV 90T56

ESCI



3 1761 09547461 5

Earth Sciences Library



Ecopact Assessment Limited
Room 2124, Sidney Smith Hall
University of Toronto
Toronto, Ontario.

November 30, 1990

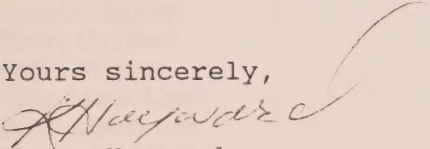
Dr. J.P.R. Whitney
Chairman - Geography Department
Sidney Smith Hall
University of Toronto
Toronto, Ontario.

Dear Sir:

Enclosed are three (3) copies of the **Environmental Assessment report on the Port Industrial Area** for your analysis and distribution as requested under the terms of reference.

Each student has a copy of the report and will be available at the EA hearing on Tuesday, December 4, 1990, at 1 pm at the Physical Geography building.

Yours sincerely,


Kerry Hayward
Project Coordinator

cc:
Students:

Toronto Port Industrial Area
Environmental Assessment Study

Ecopact Assessment Ltd.

Dave Alexander
Fred Bernard
Frank Dieterman
Arnold Gurtner
Kerry Hayward
Beth Jefferson
Nina-Marie Lister
Brian Mierzynski
Geordy Meadows
Paul Mitchell-Banks
Roslyn Moore
Judy Pucher
Helen Walters

November 30, 1990.
Toronto, Ontario.



Digitized by the Internet Archive
in 2025 with funding from
University of Toronto

<https://archive.org/details/31761095474615>

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
LIST OF TABLES	II
LIST OF FIGURES	II

1. INTRODUCTION: ENVIRONMENTAL ASSESSMENT AND SUSTAINABLE DEVELOPMENT	1
2. BACKGROUND TO DEVELOPMENT PROPOSALS FOR THE PORT INDUSTRIAL AREA	2
2.1 Brief History of the Area	2
2.2 Recent Proposals	4
2.2.1 Proposal #1	5
2.2.2 Proposal #2	7
3. THE METHODOLOGICAL APPROACH	10
3.1 The Conceptual Model	10
3.2 The Port Industrial Area Model	11
3.3 The Goals and Objectives of the Port Industrial Area and the Relationship to Sustainable Development	12
3.4 The Criteria used to Measure Goal Achievement	15
3.5 The GAM Sub-models	16
3.5.1 The Abiotic Sub-model	16
3.5.2 The Biotic Sub-model	19
3.5.3 The Human Activity Sub-model	21
4. THE IMPACTS OF THE TWO PROPOSALS	29
5. THE EVALUATION OF THE IMPACTS OF THE TWO PROPOSALS	30
5.1 Methodology for the Goals Achievement Matrix (GAM) Approach	30
6. RECOMMENDATIONS	42
7. REFERENCES	46

APPENDICES

EXECUTIVE SUMMARY

Ecopact Assessment Ltd. was hired by the Ministry of Environment, Ontario to undertake an environmental assessment of the concept plans for the development of the Toronto Port Industrial Area of Harbourfront in the context of the principles of sustainable development. An operational definition of sustainable development has been agreed upon as "the minimization of environmental impact", as this was considered the most applicable and workable. The Goals Achievement Matrix (GAM) was used to assess the criteria of achievement of the applicable goals for the several interest groups.

The Royal Commission on the Future of the Toronto Waterfront's Proposal has been assessed as being more compatible with the sustainable concept than that of the Toronto Harbour Commissioners, but serious concerns have been raised as to the implementability of the proposal, some considering it to be more conceptual than implementable.

LIST OF TABLES

Table 5.1:	Weighting of the Stakeholders Goals	31
Table 5.2:	GAM for the RCFTW Proposal	32
Table 5.3:	GAM for the THC Proposal	37

LIST OF FIGURES

Figure 3.1:	The Adaptive Environmental Assessment and Management Approach	11
Figure 3.2:	Component Groups within the GAM	13
Figure 3.3:	The Abiotic Sub-model	19
Figure 3.4:	The Biotic Sub-model	25
Figure 3.5:	The Human Activity Sub-model	27

1. INTRODUCTION: ENVIRONMENTAL ASSESSMENT AND SUSTAINABLE DEVELOPMENT

The following EA document will attempt to evaluate the Royal Commission on the Future of the Waterfront Watershed Plan (August, 1990) and the Toronto Harbour Commission Concept Plan (1988) from a perspective of sustainable development. The integration of sustainable development into an EA process (Rees 1988) could provide a paradigm in which to evaluate development projects utilizing the overriding criteria of sustainability as a major project goal.

Sustainable development is an elusive and ill-defined concept which originated with the ancient Greeks. The 1980 World Conservation Strategy and later the Brundtland Commission Report (1987) brought the concept of sustainable development into modern usage. The Brundtland Commission offered a now well used general definition of sustainable development. It is development that meets the needs of the poor without compromising the ability of future generations to meet their needs. It includes the ideals of equity, carrying capacity, and ecological integrity. As such, it is a very vague idea that is next to impossible to operationalize.

In addition to the difficulties with operationalizing the concept of sustainable development, since no agreed on definition of it exists, there are no standard parameters for measurement.

For purposes of this report, sustainable development will be defined as development which minimizes impact. Using a GAM approach, the two projects will be evaluated from this perspective.

2. BACKGROUND TO DEVELOPMENT PROPOSALS FOR THE PORT INDUSTRIAL AREA

2.1 Brief History of the Area

It is abundantly clear that the Port Industrial Area has undergone significant and fundamental changes within recent history. Indeed it has gone from containing one of the most significant wetlands in eastern North America; an area where hunting, fishing and trapping were once significant activities, to its current condition as a widely developed industrial port and commercial area.

By the beginning of the 20th century, Toronto's harbour had become the object of considerable derision: it was inadequate for navigation, its water was polluted, access was obstructed by up to eight sets of railway tracks, and the control of waterfront development was highly fragmented and suspect.

In 1911, the Board of Toronto Harbour Commissioners (THC) was established, paving the way for coordinated and sweeping changes to the waterfront, as outlined in their 1912 waterfront development plan. In accordance with its plan, the THC embarked on filling the marshes of Ashbridge's Bay to provide industrial land, a new ship channel and turning basin. By 1922, approximately 500 acres of land had been created with filled areas being eventually used for buildings, docks, and storage areas. Over the next few decades, the Port District provided a convenient dumping ground for a

variety of materials, including construction debris, excavated soil from subway development, asphalt, sewage sludge, incinerator ash, and municipal refuse.

As land was created and serviced, a variety of industries moved in. By 1931 some 41 firms had located in the Port Industrial Area, including oil refineries, oil tank storage firms, coal storage yards, coal tar distillation plants, tanneries, lumber yards, and metal foundries.

In the 1950's the opening of the St. Lawrence Seaway created expectations of increased ship traffic in the Port of Toronto. As a result, a dock wall was constructed, and lake filling behind it provided a land base for three marine terminals (MT 27, 28, and 29).

During the 1940's and early 50's there still remained a variety of wild-life habitats in the area. However in 1952 large "natural" areas were destroyed to make way for the Main Sewage Treatment Plant. Later on in the late 50's and early 60's, further shoreline filling was undertaken along the southern shore of the Port Industrial district in conjunction with the lake filling activities, to create the Outer Harbour Headland (Leslie Street Spit).

In summary, the dominant themes in the history of the port industrial area are development and habitat destruction, in which a marine ecosystem was transformed into land in order to create a port and an industrial land base. As a result the area has developed the image of being, in the words of the Royal Commission's initial Interim Report (August, 1989), "a dumping

ground for the rest of the City".

Currently, most of the lands are in the hands of the THC, the Province, Metro Toronto, and the City of Toronto. Less than 12% of the designated area is privately owned. Of the more than 100 tenants in the area, the vast majority are industrial, transportation, and commercial enterprises, as well as a small number of recreational organizations.

Although there is no residential base in the designated area at present, there are established neighbourhoods in the vicinity (e.g., South Riverdale, Harbourfront, the Toronto Islands). This fact, combined with the relatively recent historical development within the area, points to the importance of recognizing that people living in these areas may be affected by existing and future environmental conditions in the East Bayfront/Port Industrial Area. It is to this issue, and within the broader context of sustainable development (via the ecosystem approach) in general, that the proposed concept plans for the future development of the Toronto Port Industrial Area will be evaluated herein.

2.2 Recent Proposals

This report will evaluate two development proposals recently formulated by the RCFTW (August, 1990) and the THC (1988) for the Toronto Port Industrial Area. In addition to providing EA's for these two proposals, this report will also make recommendations of ways in which the favoured proposal could more closely reflect the

principles of sustainable development.

**2.2.1 Proposal #1 - The Royal Commission on the Future of the
Toronto Waterfront. Watershed - Interim
Report, August 1990.**

On 30 March 1988, the federal government appointed the Honourable David Crombie to act as a one person Royal Commission to study the Toronto waterfront. On 1 June 1988, the Royal Commission on the Future of the Toronto Waterfront (RCFTW) began its work as a federal inquiry with a mandate to:

make recommendations regarding the future of the Toronto Waterfront, and to seek the concurrence of affected authorities in such recommendations, in order to ensure that, in the public interest, federal lands and jurisdiction serve to enhance the physical, environmental, legislative, and administrative context governing the use, enjoyment and development of the Toronto Waterfront and related lands.

On 12 October 1989, the Government of Ontario appointed Mr. Crombie to carry out his duties on its behalf. The area of study for the now provincial/federal Royal Commission was subsequently expanded to include the entire Toronto watershed, from Burlington to Newcastle and north to the Oak Ridges Moraine. Watershed constitutes the Commissions second interim report.

The RCFTW has undertaken an environmental audit of Toronto's East Bayfront/Port Industrial Area for the purposes of developing the best possible description and understanding of environmental conditions of the designated area (see Royal Commission Publication No. 10: East Bayfront and Port Industrial Area: Environment in Transition).

On 17 October 1989, the Government of Ontario designated the area as being of Provincial interest under the Planning Act in order to ensure that development that might foreclose future options does not occur during the period of study and related decision making. The specific area affected is bounded on the east by Ashbridge's Bay, on the north by Lakeshore Boulevard East, and on the west by Yonge Street. It includes all the lands in the East Bayfront/Port Industrial Area down to the water, and the extension of the Leslie Street Spit as far as the northern edge of Tommy Thompson Park.

The Commission believes that the best place to start is to adopt an ecosystem approach to all phases of activity - studying, planning, remediating, protecting, and developing; whereby in order to deal effectively with the environmental problems in any ecosystem a "holistic" approach to managing human activities is required.

The Royal Commission has proposed nine "principles" to manage the waterfront, which they see as flowing from the ecosystem approach and which should form the basis of policies, planning, and evaluation for future waterfront development by all decision making bodies.

It is the view of the RCFTW that the waterfront should be:

- clean;
- green;
- useable;
- diverse;
- open;
- accessible;
- connected;
- affordable;
- attractive.

More specific recommendations that have been proposed by the RCFTW in Watershed revolve around current and future port activities being consolidated in the Port Industrial Area. As such, the opportunity for significant new parkland is created including:

- a continuous waterfront promenade being established along the entire East Bayfront and Port Industrial Area.

- Cherry Beach Park being expanded to more than 200 acres and conveyed outright to the City for parks purposes.
- the Outer Harbour Marina being conveyed to the City, to be developed as a waterfront park.
- the creation of a Don Valley Wildlife Corridor.

In addition to this, consolidation frees up and secures important new lands for jobs, new enterprise, and economic development including the creation of a new waterfront industrial park in the East Bayfront/Port Industrial area. The proposal is for the creation of the **Centre for Green Enterprise** to be managed by the Toronto Economic Development Corporation. It is to be a development of "new industry" which is environmentally friendly and/or environment related. These industries are without smokestacks, where jobs are based on, and contributing to, knowledge and information.

Additional recommendations for the area include the creation of the Toronto Waterfront Regeneration Land Trust which aims to co-ordinate the remediation, regeneration, and development of contaminated lands along the Greater Toronto Waterfront. This non-profit, provincially incorporated agency could also be the suitable body to help co-ordinate the Commission's proposed clean-up of the Don River watershed, based on an ecosystem approach.

2.2.2 Proposal #2 - The Toronto Harbour Commissioners

Port Industrial Area Concept Plan. 1988

After years of dispute between the City and the Harbour Trust about land ownership, control of development, and financing of proposed harbour improvements, the Board of Toronto Harbour Commissioners was established in 1911, and paved the way for coordinated, sweeping changes to the waterfront.

In charting a course for the future of the Port Industrial/East Bayfront Lands, the THC is drawing on its 75 years experience in waterfront management. The THC's perception, shaped by past and current realities, is being focused with one objective

in mind: to ensure that the assets under the charge of the THC are managed in the most efficient and effective manner possible, to the benefit of the people of the Toronto Region. The THC proposal is to be accomplished over a properly phased 20 year period, at no cost to the Toronto taxpayer.

The THC concept plan is grounded in the assertion that the port continues to be an integral component of the regional transportation and shipping network, serving the needs of the City, the Province, and the Country. As such, the port is a vital link to the outside commercial world and plays a key role in the diversity of the economy of Southern Ontario. In addition, the port area is seen as a key location for industry, being the largest remaining tract of industrial land left in the City of Toronto. It is further believed that the departure of this industry could have a devastating effect on the local and regional economy. According to the THC, "Toronto needs industry for a thriving and diverse economy. Industry in turn needs the port." The THC views the port as the industrial heartland of the city, and are bound to the further development and protection of port facilities.

The thrust of the plan is to maintain the integrity and vitality of the port by making certain that sufficient space and facilities are provided to meet today's and tomorrow's needs through redevelopment of the lands to accommodate industrial and other complementary business activities.

The Concept Plan's Primary Goals

The Port Industrial Area Concept Plan has been prepared with three primary goals in mind:

- 1) Provide for current and future needs of Port users;
- 2) Strengthen public access to, and enjoyment of, the Port Area;
- 3) Foster economic development within the area.

An implementation process, extending over 20 years, is recommended as being a workable timetable for the realization of the Concept Plan.

Concept Features

Some of the central concepts of the plan as outlined by the THC (in an abbreviated form) include:

- A redefined and consolidated Port Area, offering the most efficient operation base possible;
- Relocation of Port Area roads and rail alignments to improve circulation, integration with the city, and public perception of the area;
- Development of an enlarged and improved Cherry Beach Waterfront Park;
- The linking of Cherry Beach Waterfront Park with the Don Valley and the Central Bayfront;
- The creation of two business parks south of the Ship Channel;
- Retail strips along Cherry and Leslie streets;
- Upgrading the THC works facility adjacent to the Keating Channel.

Benefits Associated with the Concept Plan

Among the many benefits associated with the THC's Concept Plan are:

- Increased efficiency and opportunities for the expansion of shipping related services;
- The rationalization of the circulation system for vehicles and rolling stock within the Port Area and the opportunity for the expansion of transit services;
- an increase in the public's enjoyment of the water and the water's edge through the creation of a network of open spaces, parks, and water recreational areas, totalling some 200 acres;
- The possible creation of 200 acres of business parks on under-utilized land;
- The potential to create more than 50,000 jobs;
- the potential to generate more than \$23 million in annual municipal taxes on these lands.

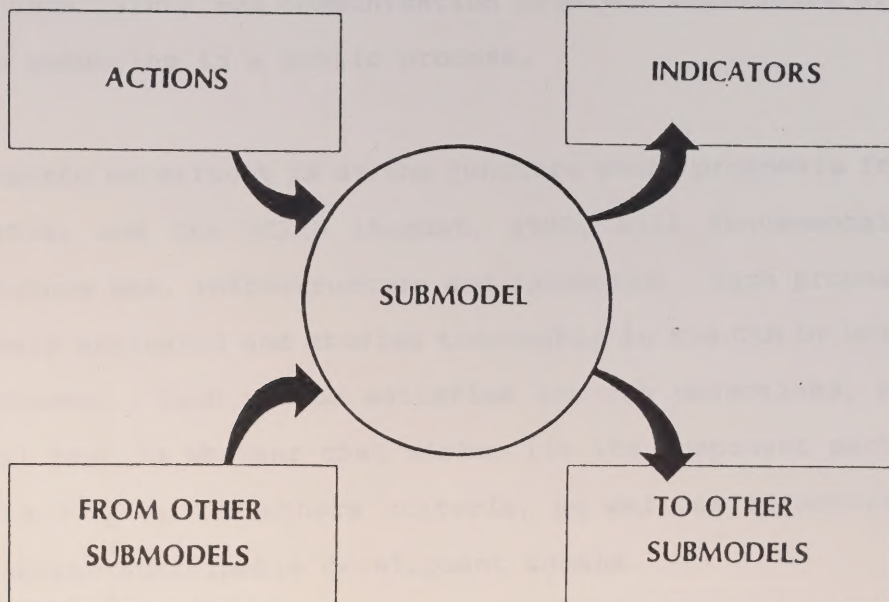
3. THE METHODOLOGICAL APPROACH

3.1 The Conceptual Model

Evaluating proposals based on their ability to meet the ideal of sustainable development requires an innovative, objective and functional method to analyse all aspects of the area under examination. The model that best satisfies this need is the Goals Achievement Matrix or GAM. Where a Cost-Benefit Analysis (CBA) falls short, the GAM approach is able to encompass difficulties in quantifying intangible and unmanageable objectives of a plan as well as the monetary realities into a structured matrix. This facilitates greater accuracy and precision in reaching an effective set of decisions to contribute to greater social welfare.

The GAM is structured to maximize all goals in a community by setting ideals that can be approached from achieving objectives that in turn are attainable from implementing effective policies. The objectives are derived from a set of measurable impacts that reflect the relative equity the community holds for that impact. This equity is also classified according to the component group in the community most affected by similar impacts.

Figure 3.1: The Adaptive Environmental Assessment and Management Approach



The structure of each submodel is defined by the inputs it requires and the outputs required of it.

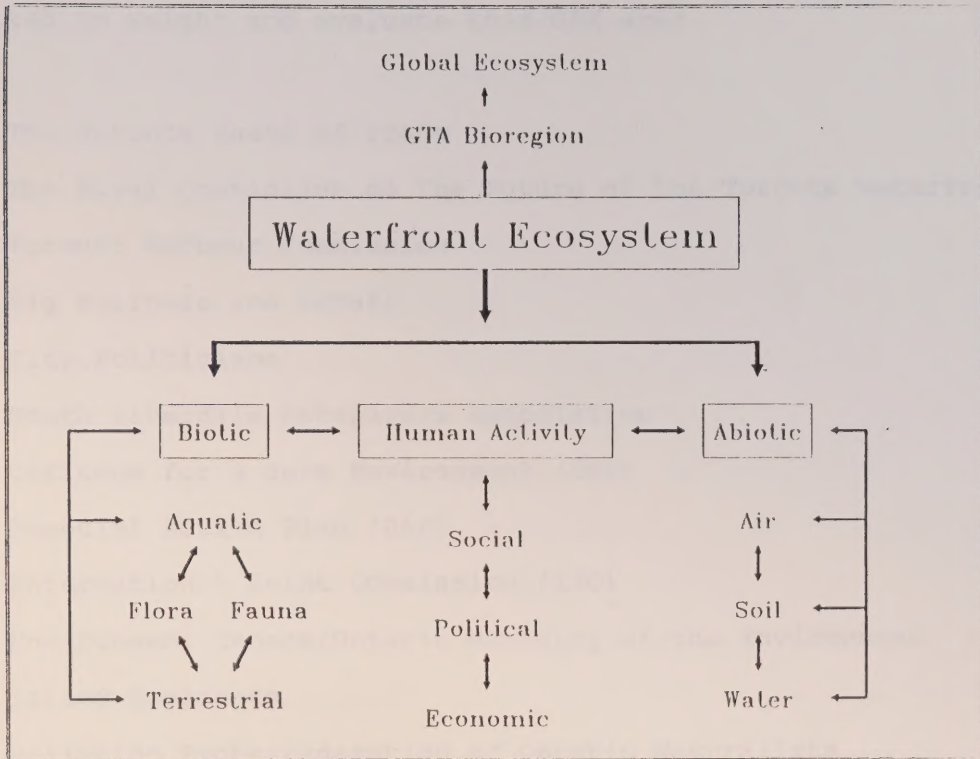
Each GAM component group develops and defines its set of impacts by interacting with other component groups by using the Adaptive Environmental Assessment and Management (AEAM) approach (Figure 3.1). This approach maximises information supply and demand, environmental resilience and sensitivity while reducing the effects of uncertainty and communication problems associated with information gathering in a public process.

The Toronto waterfront is at the juncture where proposals from the THC (1988) and the RCFTW (August, 1990) will fundamentally alter its future use, infrastructure and landscape. Each proposal is objectively evaluated and studied thoroughly in the GAM by using the AEAM process. Each vision satisfies its own objectives, but the critical test is whether that vision (in its component parts) can also stand up to the others criteria, as well as effectively strive to attain sustainable development ideals.

3.2 The Port Industrial Area Model

To facilitate better management of information and analysis of the Port Industrial Area GAM model, an intermediate step is used to classify the component community groups into abiotic, biotic and human sub-models. Figure 3.2 depicts the situation of each of the component groups as they are located within the GAM.

Figure 3.2: Component Groups within the GAM



Involved stakeholder groups in the Port Industrial Area evaluate the goals by using a relative weighting system to rank each goals preference to the other goals. This provides objective accomodation of all perspectives in the community involved in the GAM approach. The stakeholders in the Port Industrial Area selected to weight and evaluate this GAM are:

The Toronto Board of Trade

The Royal Commission on the Future of the Toronto Waterfront

Toronto Harbour Commission

Big Business and Retail

City Politicians

South Riverdale Ratepayers Association

Citizens for a Safe Environment (CSE)

Remedial Action Plan (RAP)

International Joint Commission (IJC)

Environment Canada/Ontario Ministry of the Environment

Island Residents

Pollution Probe/Federation of Ontario Naturalists

Metropolitan Toronto Regional Conservation Authority (MTRCA)

3.3 The Goals and Objectives of the Port Industrial Area and the Relationship to Sustainable Development

The Royal Commission on the Future of the Toronto Waterfront

and the Toronto Harbour Commissioners list a contrasting set of goals used in evaluating each proposals Port Industrial Area vision. The RCFTW proposal (August, 1990) lists the goals to measure the success of the proposal as:

1. Clean: The abiotic components should be free of contaminants that impair beneficial uses by people and other living things.
2. Green: Ecological communities should be diverse and productive.
3. Useable: The waterfront should support a mix of public and private uses that are primarily water-related and do not conflict with one another, nor with the environment.
4. Diverse: A balanced mix of built and natural environments.
5. Open: The density and design of the waterfront structures should not create a visual barrier or be an intrusion on the water's edge.
6. Accessible: By foot, bicycle, road and public transit.
7. Connected: The waterfront should be linked by continuous pedestrian and bicycle trails and major green corridors.

8. Affordable: Parks and facilities should be financially available to all income groups and any residential projects should include affordable housing.
9. Attractive: Appropriate design, visually pleasing.

The Toronto Harbour Commissioners (1988) outline three goals for the Port Industrial Area:

1. To provide for current and future needs of port users by allocating sufficient lands.
2. To strengthen public access and enjoyment of the port.
3. To foster economic development.

In the need for manageability of the THC proposal, the three goals were reorganized into four measurable objectives:

1. Enhance port use.
2. Economic development.
3. Attract tourists.
4. Status quo ownership.

By using the AEAM approach in determining needs for each disciplinary aspect of the ecosystem in the Port Industrial Area, scientifically quantifiable indicators, found from each of the above thirteen objectives, can be used to measure the relative

health of the component group. In turn, each proposal is assessed on the ability to meet the key indicators of the component groups. From determining this achievability, each aspect of the proposals will have a relative position to each other. In addition, to give both proposals a perspective, the sustainable development ideal to which each proposal, and indeed each aspect of the proposal, is best suited to meet the needs of developing a sustainable ecosystem in the Port Industrial Area. By indicating the strengths and weaknesses of each proposal in the light of sustainable development, an objective determination and recommendation can be made to indicate beneficial future development of the Port Industrial Area.

3.4 The Criteria Used to Measure Goal Achievement

In identifying criteria needed to operationalize the goals, each sub-group determined a set of indicators relevant to their own sub-model, attempting to predict impact on that sub-model by the two proposals. Individual summaries established a standardized scale of -3 to +3, with a positive value representing progress towards a goal and a negative value representing departure from a goal. Zero (0) indicates no anticipated change from present environmental conditions. The possibility that the system is degrading or improving on its own was not considered in the GAM.

A weighting scale was also developed to rank the goals of the individual stakeholders -- 0 to 5, where zero (0) indicates that the goal is not significant and five (5) indicates that the particular goal is most significant for the stakeholder.

Numerical standards are used where needed, in the evaluation, otherwise professional value judgment and individual expertise in each respective discipline was used in determining the value that most accurately ascribed to the criteria. It is also possible that a goal may not apply or accurately support the indicators of a component group. Similarly, reasonable indicators of the well-being of a component group may not be reflected in any or all of the goals. Discussion and consensus within each sub-model area is important in establishing objective criteria and weightings.

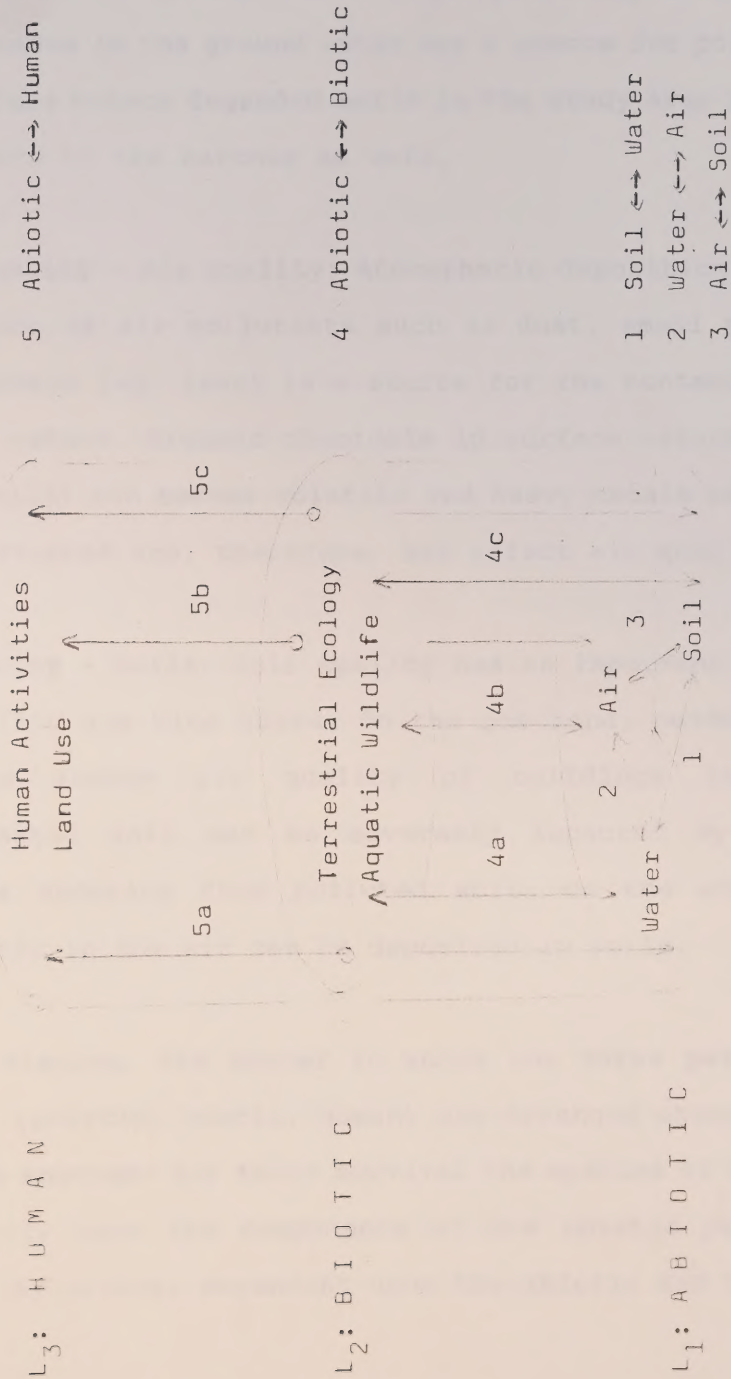
3.5 The GAM Sub-models

3.5.1 The Abiotic Sub-model

The abiotic sub-model (see Figure 3.3) includes the links between the **abiotic part of the system** (soil, water, air) as well as the links to the two other parts of the system (biotic, human).

Between the components of the abiotic sub-system **three major links** exist (arrows 1 to 3 in Figure 3.3):

Figure 3.3: The Abiotic Sub-model



- (1) **Soils - Water quality:** Generally, soil conditions affect ground water and surface water quality. Contaminants in soil often leach into ground water, thus polluting such water. As contaminants in the ground water are a source for pollution of the surface waters degraded soils in the study area may impair the waters of the harbour as well.
- (2) **Water quality - Air quality:** Atmospheric deposition, that is, deposition of air pollutants such as dust, small particles, heavy metals (eg. lead) is a source for the contamination of surface waters. Organic chemicals in surface waters (as well as in soils) can become volatile and heavy metals resuspended when disturbed and, therefore, may affect air quality.
- (3) **Air quality - Soils:** Soil quality has an important impact on air quality and vice versa. On the one hand, outdoor air as well as indoor air quality of buildings located on contaminated soil can be adversely impacted by volatile organics escaping from polluted soil. On the other hand, pollutants in the air can be deposited in soils.

In the diagram, the manner in which the **three parts of the whole system** (abiotic, biotic, human) are arranged shows how they **rely one upon another**: for their survival the species of the biotic sub-system rely upon the components of the abiotic part, while humans are, by nature, dependent upon the abiotic and the biotic

elements of their environment. At the same time, the components of the abiotic sub-system are affected by human activities as well as by changes in the biotic sub-system.

In detail, the following relations exist (see Figure 3.3):

- (4a) **Water quality - Biotic components:** Degraded water quality restricts natural aquatic habitats as well as the existence of biota on shore.
- (4b) **Air quality - Biotic components:** Generally, poor air quality adversely affects terrestrial and aquatic ecosystems. Certain pollutants can limit growth and reproduction or directly kill specific organisms.
- (4c) **Soils - Biotic components:** In the case of the biotic sub-model, soils are particularly important to the terrestrial environment. The productivity and diversity of various plant species for example, are dependent on the quality and availability of soils for plant growth. In fact, the health of various indigenous plant species and the quantities and types of soil organisms such as earthworms are generally good indicators of the quality of soils.
- (5a) **Water quality - Human activities:** Several human activities in the Port Industrial and East Bayfront Areas (Port uses, Industrial uses, effluents from Sewage Treatment Plants) have substantial negative impact on water quality. Degraded water

quality, which may affect human health, can also restrict recreational activities (eg. water contact sports).

(5b) **Air quality - Human activities:** Human activities in the East Bayfront and Port Industrial Area such as manufacturing, transportation and shipping adversely affect air quality. Degraded air quality is a risk for human health, high concentrations of carbon monoxide for example, may cause cardiovascular problems, nausea and dizziness.

(5c) **Soils - Human activities:** Soil quality, especially as outlined by federal and provincial regulations, is to a great extent defined within the context of human use. Thus, the soil component of the abiotic sub-model and the human activity sub-model are intrinsically linked. The health of a community is directly impacted by the quality of soils to which the public is exposed. Soils contaminated with heavy metals for example, have been known to have various adverse impacts on human health.

Soil quality can also restrict certain industrial activities. For example, many companies would refuse to locate in the East Bayfront/Port Industrial Area, knowing the history of soil contamination in that area. Companies are generally averse to paying soil remediation cost as part of a real estate transaction.

3.5.2 The Biotic Sub-model

This sub-model was further divided into 3 sections -- Terrestrial, Aquatic and Canadian Wildlife Service (CWS) -- based on the expertise of the members of the sub-model. The two proposals for the Port Industrial Area, Toronto Harbour Commission and Royal Commission on the Future of the Toronto Waterfront, were examined to establish similarities and differences. The biotic sub-group placed emphasis on Green Space/Parkland and the type of industry projected by each proposal, as these aspects were believed to have the greatest impact on the biotic ecosystem.

The Terrestrial section focused on the amount of green space to be created at the Base of the Leslie Street Spit. The Aquatic section examined connections to the area via the Don River Valley, Harbour and Lake Ontario. The Canadian Wildlife Service examined its future role in relationship to work already being done with Wildlife Species Control, Habitat Monitoring and Contamination, and future Wildlife Interpretive Areas. Aquatic and terrestrial sub-sections overlapped in dealing with low lying seasonally wet areas and habitat close to shore.

Information was obtained through the Royal Commission Working Papers -- Aquatic Environment, Natural Heritage (May 1990), and the Second Draft of the Natural Heritage Technical Paper (Oct. 1990) -- and the Toronto Harbour Commission Discussion Paper (Mar. 1988).

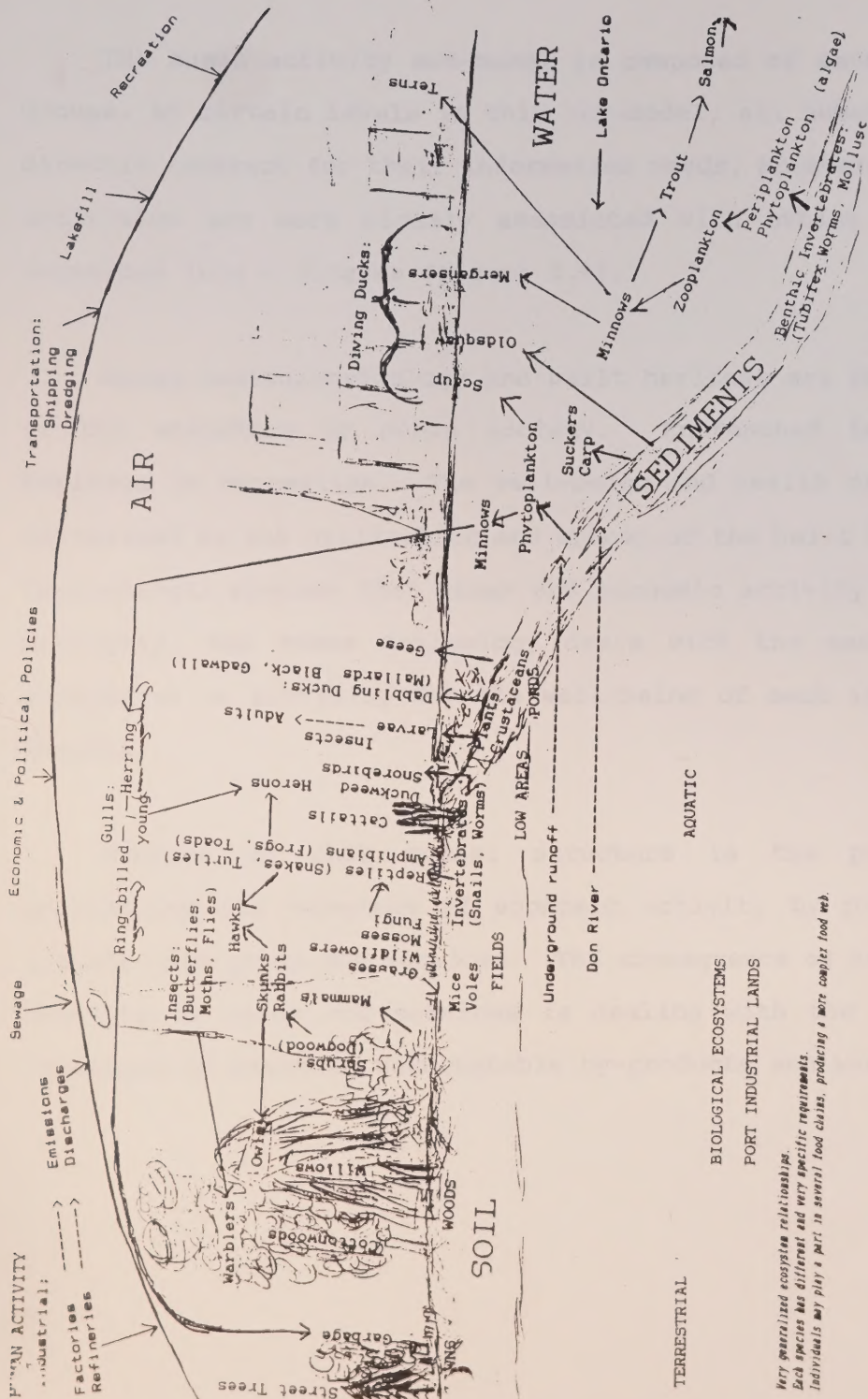
The components of each individual sub-section were identified, and a concept model of the waterfront biological ecosystem was

drawn up to visually establish major inter-relationships within the entire biotic sub-system and the impact of each of the other sub-groups to the ecosystem (see Figure 3.4). Each member of the sub-group also identified, in an outward-looking exercise, information that was required from the other sub-groups to determine the impact of the THC and RC proposals.

The goals of clean and green, as defined by the Royal Commission Watershed Report (August 1990) were found to be applicable to the biotic sub-group. In order to operationalize these goals, a sub-set of criteria were identified for each goal. These criteria enabled an assessment to be made of the impacts of the two proposals on the sub-model components, aquatic and terrestrial, and the implications for the Canadian Wildlife Service, and the consequent ramifications of that impact for the other sub-groups. The impacts were determined with reference to the definition of sustainable development in section 1.0 .

Indicator species were identified from terrestrial and aquatic ecosystems to monitor the health of individual populations and thus the ecosystem as a whole, and to determine which species could be used as mitigators of environmental health.

Figure 3.4: The Biotic Sub-model



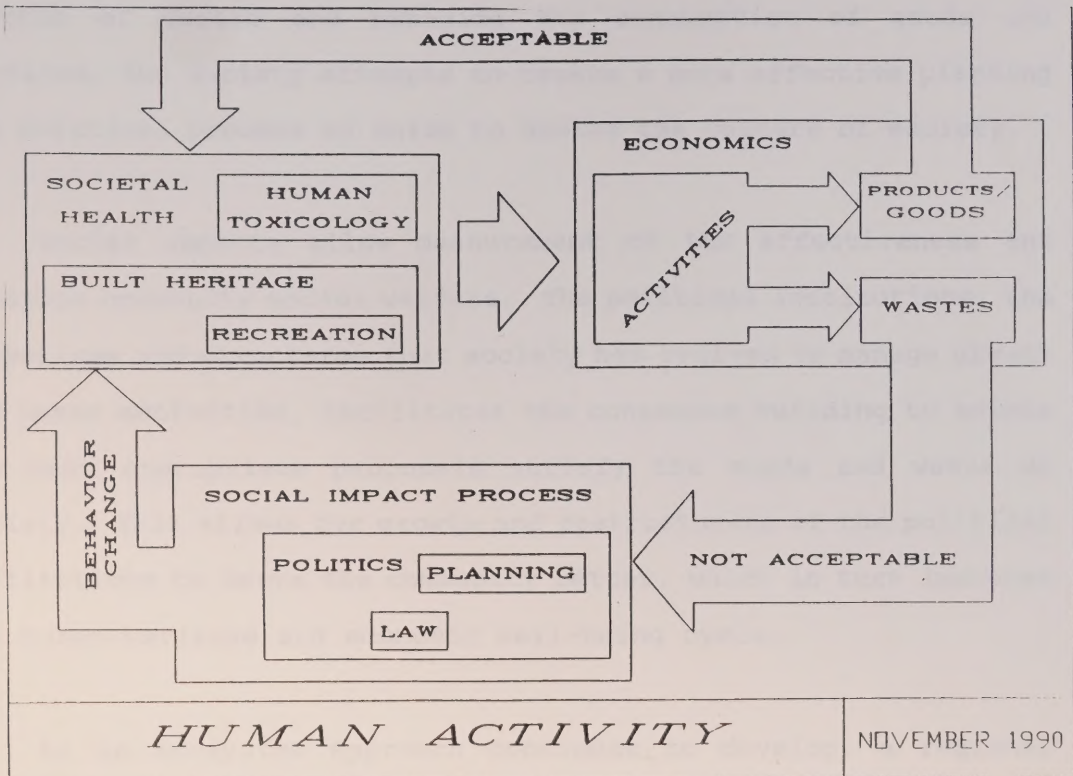
3.5.3 The Human Activity Sub-model

The human activity sub-model is composed of seven component groups. At certain levels in this sub-model, all human activities directly interact for their information needs. However, some human activities are more closely associated with others and can be organized into a diagram (Figure 3.5).

Human health/toxicology and built heritage are the two parts of the structure of human society. Entrenched in the built heritage is recreation. The well-being and health of society is maintained by the utilization and upkeep of the built heritage and recreational systems that human and economic activity is founded. Similarly, the human toxicology deals with the mechanisms and structures in providing for the well-being of each individual in society.

Founded on this social structure is the processes of maintaining the momentum of economic activity by providing the society with goods and services. The consequence of achieving the benefits of goods and services is dealing with the reality and tolerance of managing unacceptable by-products and wastes.

Figure 3.5: The Human Activity Sub-model



Products and goods would have a positive social impact and wastes would have a negative social impact. By minimizing social impacts of wastes and managing the consumption of goods and services, the society attempts to create a more effective planning and political process on which to evolve the culture of society.

Social impacts allow measurement of the effectiveness and coverage community social welfare. The political institutions, the mechanisms and structures that society has evolved to manage growth and human activities, facilitates the consensus building to select the most appropriate proposals satisfy the needs and wants of society. This allows for growth and restructuring of the political institutions to serve the community better, which in turn improves the human-heritage and economic well-being cycle.

As an ecosystem approach continues to develop, a regional model of sub-group interactions will evolve with major similarities and themes being evident when different ecosystems are compared and contrasted. The Waterfront Ecosystem of the Toronto Port Industrial Area is essentially a small part of the global ecosystem. In developing the management, carrying capacity, and analytical techniques in this area, the ideals and dynamics of sustainable development can be understood and implemented.

4. THE IMPACTS OF THE TWO PROPOSALS

This chapter includes the evaluation of the impacts of the two proposals on the components of the biotic sub-system (APPENDIX A1 to A3), the abiotic sub-system (APPENDIX B1 to B3) and the human activity system (APPENDIX C1 to C7).

5. THE EVALUATION OF THE IMPACTS OF THE TWO PROPOSALS

5.1 Methodology for the Goals Achievement Matrix (GAM) approach

The data for the GAM was derived in two stages. In the first stage, outlined in Table 5.1, a combination of thirteen goals outlined by the the Royal Commission and the THC were ranked from the perspective of various stakeholders. Each goal was ranked on a scale of 0 to 5, where 0 indicates "no significance" and 5 indicates "highest significance". The values for each individual goal was then summed. The highest possible value for each of these goals is 65.

In the second stage of the process (Table 5.2 and 5.3) , various indicators of the goals, outlined in the first stage, were ranked from the perspective of scientific expertise. These indicators were considered with respect to both the Royal Commission's and the THC's proposal. For each sub-model, criteria which were determined as indicators which operationalized each of the applicable thirteen goals, were chosen. Each relevant indicator was assigned a value from -3 to 0 to +3, where 0 indicates no change from the existing baseline conditions induced by the project. +3 indicates a significant positive change, -3 a significant negative change.

The ranked indicator values were then summed for each goal. Next, for each of these goals a weighted average was calculated. The stakeholder weights for each goal, derived from the first

stage, was then multiplied by the weighted average. This was summed for each goal to provide a GAM total for each individual proposal.

Table 5.1: Weighting of the Stakeholders Goals

GOALS	STAKEHOLDERS													TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	
CL	3	5	2	0	4	5	5	5	5	5	5	5	5	54
G	1	5	0	0	3	5	5	1	4	5	5	5	5	44
U	4	5	4	4	4	5	3	5	3	4	4	3	5	53
D	3	5	0	3	3	3	2	0	3	3	1	3	5	34
O	2	5	3	0	3	4	1	0	0	4	5	5	4	38
FEA	2	5	0	0	3	3	4	5	3	2	4	5	5	41
C	4	5	3	2	3	3	2	0	0	3	4	5	5	39
A	5	5	0	1	3	4	2	0	0	2	3	5	5	35
ATT	4	5	4	1	4	4	2	1	0	3	5	5	4	42
EPU	5	4	5	5	4	2	0	3	0	0	0	0	2	30
ED	5	4	5	5	5	3	0	3	0	2	0	3	2	37
AT	2	5	4	5	5	2	0	4	0	2	3	2	3	37
SQO	5	0	5	5	3	3	0	0	0	0	5	0	3	29

- NOTE: 1. GOALS [CL=CLEAN, G=GREEN, U=USEABLE, D=DIVERSE, O=OPEN, FEA=FOSTER ENVIRONMENTAL AWARENESS, C=CONNECTED, A=AFFORDABLE, ATT=ATTRACTIVE, EPU=ENHANCE PORT USE, ED=ECONOMIC DEVELOPMENT, AT=ATTRACT TOURISTS, SQO=STATUS QUO OWNERSHIP]
2. STAKEHOLDERS [1=BOARD OF TRADE, 2=ROYAL COMMISSION ON WATERFRONT, 3= TORONTO HARBOUR COMMISSION, 4=BIG BUSINESS/RETAIL, 5=CITY POLITICIANS, 6=S. RIVERDALE, 7= CSE, 8= REMEDIAL ACTION PLAN (RAP), 9=INTERNATIONAL JOINT COMMISSION (IJC), 10=ENVIRONMENTAL CANADA/MOE, 11=IR, 12= POLLUTION PROBE, 13=MTRCA.]

WEIGHT OF STAKEHOLDER GOALS

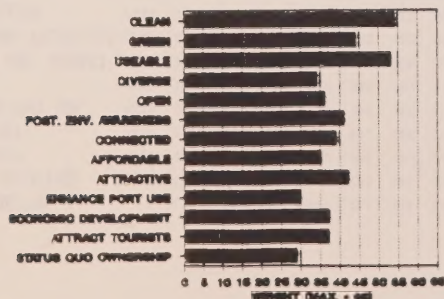


Table 5.2: GAM for the RCFTW Proposal

CODE	INDICATORS	ROYAL COMMISSION (RCFTW) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-SI	DECREASE IN LEVELS OF CONTAMINANTS IN SOIL,	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	AIR, WATER, WHICH IMPAIR USE/ HABITATION AS PER	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	MOE STANDARDS FOR EFFLUENTS AND OUTFLOW	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	MONITORING	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	ADHERENCE TO DEPT. OF HEALTH STANDARDS FOR	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	DRINKING WATER AND BATHING BEACH OPENINGS; LOW	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	FECAL COLIFORM BACTERIA COUNTS, ETC.	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF OPEN BEACHES	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF WATER RECREATION USERS	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN FINANCIAL INVESTMENT IN SOIL	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	DECOMMISSIONING	1	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF AQUATIC INDICATORS; DECREASE	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	IN # OF FISH WITH TUMORS OR DEFORMITIES;	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	DECREASE IN TOXIN LEVELS IN FISH AS PER MNR	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	STANDARDS; INCREASED # OF FISH SUITABLE FOR	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	CONSUMPTION	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	IMPROVED VISUAL AESTHETICS; ABSENCE OF GARBAGE,	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	OIL AND GREASE; ABSENCE OF ALGAE	2	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN NATURAL VEGETATION, EG. # OF	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	TREES PLANTED	----	2	----	----	----	----	----	----	----	----	----	----	----
HA-SI	MAINTENANCE OF WILDSpace; NATURAL HABITAT,	----	----	----	----	----	----	----	----	----	----	----	----	----
HA-SI	SENSITIVE AREAS	----	3	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN SPECIES DIVERSITY	----	3	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN INDICATOR SPECIES	----	2	----	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF PUBLIC PARKS	----	----	3	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF CLEAN, SAFE BEACHES	----	----	3	----	----	----	----	----	----	----	----	----	----
HA-SI	PRESENCE OF WHEELCHAIR ACCESS RAMPS	----	----	3	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN WATER-RELATED USES	----	----	3	----	----	----	----	----	----	----	----	----	----
HA-SI	PUBLIC ACCESSING PORT AREA VIA PUBLIC TRANSIT	----	----	2	----	----	----	----	----	----	----	----	----	----
HA-SI	EASE OF ACCESS: SENIORS, KIDS, STROLLERS	----	----	2	----	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN # OF BIKES, FOOT PATHS	----	----	3	----	----	----	----	----	----	----	----	----	----
HA-SI	DIVERSE EXPERIENCES FOR PUBLIC	----	----	----	2	----	----	----	----	----	----	----	----	----
HA-SI	INCREASE IN OPEN & GREEN SPACE	----	----	----	----	3	----	----	----	----	----	----	----	----
HA-SI	ACCESSIBILITY OF SHORELINE TO PUBLIC	----	----	----	----	3	----	----	----	----	----	----	----	----
HA-SI	PROVISION OF EDUCATIVE RESOURCES	----	----	----	----	----	3	----	----	----	----	----	----	----
HA-SI	# OF BUSIN. INVOLVED IN CONSERVATION	----	----	----	----	----	3	----	----	----	----	----	----	----
HA-SI	# OF PEOPLE ATTENDING SEMINARS RE: ENV. ISSUES	----	----	----	----	----	3	----	----	----	----	----	----	----
HA-SI	# OF KM OF CONNECTED BIKE & FOOT PATHS	----	----	----	----	----	----	3	----	----	----	----	----	----
HA-SI	CONTINUITY OF WILDLIFE CORRIDORS	----	----	----	----	----	----	3	----	----	----	----	----	----
HA-SI	ACCESSIBILITY OF WATERFRONT TO ALL INCOME GRPS	----	----	----	----	----	----	----	3	----	----	----	----	----
HA-SI	INCREASE IN TAXES/ SOCIAL COSTS	----	----	----	----	----	----	----	-2	----	----	----	----	----
HA-SI	BALANCE OF NATURAL & BUILT HERITAGE	----	----	----	----	----	----	----	----	3	----	----	----	----
HA-SI	POST-PROJ. MEASURES OF USER PERCEPTION	----	----	----	----	----	----	----	----	3	----	----	----	----
HA-SI	INC. IN # OF WATER-RELATED TRANSPORT ACTIVITIES	----	----	----	----	----	----	----	----	----	1	----	----	----
HA-SI	ACCESSIBILITY OF SHORE TO COMM. & REC. VESSELS	----	----	----	----	----	----	----	----	----	3	----	----	----
HA-SI	INCREASE IN JOBS	----	----	----	----	----	----	----	----	----	----	2	----	----
HA-SI	INCREASE IN STANDARD OF LIVING FOR AREA POP	----	----	----	----	----	----	----	----	----	----	0	----	----
HA-SI	INCREASE IN # OF TOURISTS USING AREA	----	----	----	----	----	----	----	----	----	----	----	2	----
HA-SI	INCREASE IN TOURISM-RELATED BUSINESS	----	----	----	----	----	----	----	----	----	----	----	1	----
HA-SI	MAINTENANCE OF CURRENT OWNERSHIP PRIVILEGES	----	----	----	----	----	----	----	----	----	----	----	----	-2
HA-HI	REDUCTION OF EMISSIONS FROM AUTOMOBILES	1	----	----	----	----	----	----	----	----	----	----	----	----

CODE	INDICATORS	ROYAL COMMISSION (RCFTW) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-HI	REDUCTION OF EMISSIONS FROM PORT INDUSTRIES	2	----	---	---	---	---	---	---	---	---	---	---	---
HA-HI	SOIL DECONTAMINATION TO DECREASE POSS OF HEAVY-	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-HI	WATER QUALITY IMPROVEMENT RE: FECAL COLIFORM	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-HI	GENERAL IMPROVEMENT OF ECOSYSTEM HEALTH	----	2	---	---	---	---	---	---	---	---	---	---	---
HA-HI	AREA USED BY TOTAL POP: INCL. HANDICAPPED ETC.	----	----	0	---	---	---	---	---	---	---	---	---	---
HA-HI	ADEQUATE SAFETY FEATURES TO PREVENT ACCID/CRIME	----	----	0	---	---	---	---	---	---	---	---	---	---
HA-ECO	GROWTH IN EMPLOYMENT	----	----	---	---	---	---	---	---	---	---	2	---	---
HA-ECO	GROWTH IN INCOME/PROFITS	----	----	---	---	---	---	---	---	---	---	2	---	---
HA-ECO	SECTORAL COMPOSITION OF LIGHT TO HEAVY	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	INDUSTRY ON THE WATERFRONT	----	----	---	3	---	---	---	---	---	---	---	---	---
HA-ECO	LORENTZ TYPE ANALYSIS SHOWING WHAT PERCENTAGE	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	OF USERS FALL WITHIN WHAT PERCENTAGE OF INCOME	----	----	---	3	---	---	---	---	---	---	---	---	---
HA-ECO	AVERAGE EMISSION LEVELS/\$ OUTPUT PRODUCED ON	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	THE WATERFRONT	3	3	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	MEETING MOE STANDARDS ON LEVEL OF CONTAMINANTS	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	PRESENT ON THE WATERFRONT	1	1	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	% CHANGE IN GREEN INDUSTRY AS PERCENTAGE OF	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	RATIO TO WATERFRONT ECONOMY	3	3	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	CHANGE IN THE NUMBER OF OWNERS OF WATERFRONT	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	PROPERTY (MORE OWNERS ARE SEEN AS NEGATIVE, AS	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	IT LEADS TO LESS ABILITY TO PLAN	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	COMPREHENSIVELY WHILE INCREASING UNCERTAINTY	----	----	---	---	---	---	---	---	---	---	---	---	-2
HA-ECO	% CHANGE IN SHIPING TONNAGE	----	----	---	---	---	---	---	---	---	-2	---	---	---
HA-ECO	CHANGE IN LAND VALUES (INCREASE IS SEEN AS	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	NEGATIVE IMPACT, LIMITING INDUSTRY TO GROW IN	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	AREA	----	----	---	---	---	---	---	-1	---	---	---	---	---
HA-ECO	COMPOSITE FIGURE MEASURING AVERAGE COST OF	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	DAY'S ACTIVITIES	----	----	---	---	---	---	---	-1	---	---	---	---	---
HA-ECO	\$ SPENT BY WATERFRONT INDUSTRY ON ENVIROMENTAL	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	R&D, AND PUBLIC EDUCATION CAMPAIGNS	----	----	---	---	---	3	---	---	---	---	---	---	---
HA-ECO	GROWTH OF ECONOMIC VALUE OF THE SECTOR	----	----	---	---	---	---	---	---	---	---	---	2	---
HA-ECO	% CHANGE OF EMPLOYMENT LEVELS GENERATED ON THE	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-ECO	WATERFRONT, DERIVED FROM TOURISM	----	----	---	---	---	---	---	---	---	---	---	2	---
AB-SLS	FOSTER COMPLIANCE W MOE SOILS GUIDELINES	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	PROMOTE ENV. FRIENDLY INDUSTRIAL DEVLPMT	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	REDUCE ADVERSE IMPACTS ON TERRESTRIAL SPECIES	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	REDUCE POSSIBLE ADVERSE IMPACTS ON HUMAN HLTH	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	REDUCE GROUNDWATER CONTAMINATION FROM POLL.SOIL	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	REDUCE SOIL POLLUTION THRU REMEDIATION STRATEGY	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	INC POSS OF EXPANDING GREEN AREAS THRU REMED ST	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-SLS	COST CONSIDERATIONS RELEVANT TO REMED STRATEGY	1	1	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: TOTAL SUSPENDED PARTICULATES (TSP)	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: SULFUR DIOXIDE (SO2)	0	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: CARBON MONOXIDE (CO)	0	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: NITROGEN DIOXIDE (NO2)	0	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: PHOTOCHEMICAL OXIDANTS (PCOs)	0	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	AIR: NON-METHANE HYDROCARBONS (HC)	0	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	WATER: 5 DAY BIOLOGICAL OXYGEN DEMAND (BOD5)	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	WATER: TOTAL SUSPENDED SOLIDS (TSS)	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	WATER: PHOSPHOROUS (P)	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-#ST	SOLID: QUANTITY (IN TONS)	1	----	---	---	---	---	---	---	---	---	---	---	---

CODE	INDICATORS	ROYAL COMMISSION (RCFTW) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-WST	WASTE REDUCING TECHNOLOGIES	----	2	---	---	---	---	---	---	---	---	---	---	---
HA-WST	WASTE CLEANUP/REMEDIAL ACTION	----	1	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ATTEMPTS TO INCREASE PUBLIC AWARENESS ABOUT	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ENVIRONMENT AND THE THE IMPACT OF WASTE ON THE	----	----	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ENVIRONMENT	----	----	---	---	---	2	---	---	---	---	---	---	---
BI-CWS	USE OF INDICATOR SPECIES IN BIOMONITORING	----	3	----	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR QUALITY & QUANTITY OF GREEN SPACES	----	3	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	EVALUATE PROPORTION OF NATURAL TO MANICURED SPA	----	3	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR GEN HEALTH OF ECOLOGICAL COMMUNITIES	----	3	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	WATERFRONT APPEAL TO MULTIPLE USERS ESP NAT'LISTS	----	----	3	---	---	---	---	---	---	---	---	---	---
BI-CWS	ACCOMMODATE NEEDS OF TOTAL POP INCL HANDICAPPED	----	----	3	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR USE OF AREA W SURVEYS	----	----	3	---	---	---	---	---	---	---	---	---	---
BI-CWS	DIVERSE USE OF AREA: PUBLIC & PRIVATE	----	----	3	---	---	---	---	---	---	---	---	---	---
BI-CWS	CONSTRUCTION OF TRAIL SYSTEM W MAX WATER ACCESS	----	----	----	3	---	---	---	---	---	---	---	---	---
BI-CWS	INCREASE PUBLIC TRANSIT & PARKING IN AREA	----	----	---	---	---	3	---	---	---	---	---	---	---
BI-CWS	NETWORK OF BIKE/FOOT PATHS RESPECTING WILDLIFE	----	----	---	---	---	3	---	---	---	---	---	---	---
BI-CWS	ACCESS BY TOTAL POP INCL AGED & HANDICAPPED	----	----	---	---	---	3	---	---	---	---	---	---	---
BI-CWS	CONTINUOUS TRAILS TO LINK ENTIRE WATERFRONT	----	----	---	---	---	3	---	---	---	---	---	---	---
HA-BH	CONTAMINANT FREE	1	1	---	---	---	---	---	---	---	---	---	---	---
HA-BH	ENVIRONMENTALLY FRIENDLY: FORM & FUNCTION	1	1	---	---	---	---	---	---	---	---	---	---	---
HA-BH	PRESERVE HISTORIC BUILDINGS	2	2	---	---	---	---	---	---	---	---	---	---	---
HA-BH	SENSITIVE ADAPTIVE RE-USE	0	0	---	---	---	---	---	---	---	---	---	---	---
HA-BH	# OF HERITAGE SITES	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	SURFACE WATER QUALITY: LEVEL OF PHOSPHOROUS OR	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	NITROGEN	2	----	---	---	---	---	---	---	2	---	---	2	---
AB-WQ	SURFACE WATER QUALITY: BACTERIAL	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	CONTAMINATION	2	----	---	---	---	---	---	---	2	---	---	2	---
AB-WQ	SURFACE WATER QUALITY: LEVEL OF TURBIDITY AND	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	TOTAL SUSPENDED SOLIDS	2	----	---	---	---	---	---	---	2	---	---	2	---
AB-WQ	SURFACE WATER QUALITY: CONCENTRATION OF	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	HEAVY METALS	2	----	---	---	---	---	---	---	2	---	---	2	---
AB-WQ	SURFACE WATER QUALITY: CONCENTRATION OF ORGANIC	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	CONTAMINANTS	2	----	---	---	---	---	---	---	2	---	---	2	---
AB-WQ	GROUND WATER QUALITY: CONC. OF PHENOL	----	3	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF VOC	----	3	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF PCB	----	3	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF HEAVY METALS	----	3	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	CO	-1	-1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	DUST	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	SUSPENDED PARTICULATE	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	ODOUR	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	NOISE	2	2	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	SOIL CONTAMINATION (AFFECTS INDOOR AIR	----	----	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	QUALITY)	2	2	---	---	---	---	---	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: VASCULAR PLANTS	3	3	---	---	---	---	3	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: RARE PLANTS	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: INVERTEBRATES	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: AMPHIBIANS & REPTILES	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: MAMMALS	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: VASCULAR PLANTS	3	3	---	---	---	---	3	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: RARE PLANTS	1	1	---	---	---	---	1	---	---	---	---	---	---

CODE	INDICATORS	ROYAL COMMISSION (RCFTM) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
BI-TER	POP/N ABUNDANCE: INVERTEBRATES	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: AMPHIBIANS & REPTILES	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: MAMMALS	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: NUISANCE SPECIES	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: SEMI-BARE GRND/RECENT FILL	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: OPEN FIELD	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: PRE-WOODLAND	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: COTTONWOOD WOODLAND	0	0	---	---	---	---	0	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: BEACH & GRAVEL SHORELINE	3	3	---	---	---	---	3	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: WET MEADOW/MARSH	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: WILLOW THICKETS	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: MANICURED LANDS	1	1	---	---	---	---	1	---	---	---	---	---	---
BI-TER	ORGANISM HEALTH: REDUCTION OF VISIBLE GARBAGE	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-AE	GREATER SPECIES DIVERSITY	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	TYPES OF SPECIES (MORE DESIRABLE)	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	GREATER ABUNDANCE OF LIFE	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	DOWN RIVER CLEAN UP & REGENERATION OF AREA	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN SEDIMENTS	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN CLAMS	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN YOY SHINERS	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN SPORT FISH	1	1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN FISH-EATING BIRDS	1	1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE IN PARKS	-1	-1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE AROUND INDUSTRY	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE IN ALGAE	2	2	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS BACTERIA AT C. BEACH (MORE SWIMMING)	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	GREATER HABITAT DIVERSITY	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	SUITABLE FISH HABITAT	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	SUITABLE THERMAL VARIATION FOR FISH	2	2	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS SUSPENDED SEDIMENTS	2	2	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE TRAFFIC CREATING DISTURBANCE IN SUMMER	-1	-1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE TRAFFIC CREATING DISTURBANCE IN WINTER	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE DISTURBANCES FROM SHIPPING	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE DISTURBANCES FROM DREDGING	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	DECREASED INDUSTRIAL EMISSIONS	3	3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	RECREATIONALISTS	-1	-1	---	---	---	---	---	---	---	---	---	---	---
HA-REC	SOIL REMEDIATION	0	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	AIR QUALITY FOR RECREATION ACTIVITIES	2	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	WATER QUALITY FOR RECREATION ACTIVITIES	2	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	DEGREE OF POLLUTING INDUSTRIES	2	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	INCREASING OPEN GREEN SPACES OR PARKLAND	----	3	---	---	---	---	---	---	---	---	---	---	---
HA-REC	PROTECT AND RESTORE ECOLOGICAL COMMUNITIES FOR	----	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	FISHING, BIRDING, NATURALISTS	----	2	---	---	---	---	---	---	---	---	---	---	---
HA-REC	AMOUNT OF INDUSTRY PRESENT	----	1	---	---	---	---	---	---	---	---	---	---	---
HA-REC	ACTIONS THAT PERMIT PUBLIC ACCESS, USE & ENJOY-	----	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	MENT OF WATER'S EDGE	----	---	3	---	---	---	---	---	---	---	---	---	---
HA-REC	PROMOTE GREATER YEAR ROUND USE	----	---	2	---	---	---	---	---	---	---	---	---	---
HA-REC	AMENABLE TO TOTAL POP INCL DISABLED	----	---	1	---	---	---	---	---	---	---	---	---	---
HA-REC	PROVIDE DIVERSE EXPERIENCES TO PUBLIC	----	---	---	3	---	---	---	---	---	---	---	---	---
HA-REC	ACTIVITIES OTHER THAN SPORTS ONLY	----	---	---	2	---	---	---	---	---	---	---	---	---
HA-REC	INTENSIFY PORT AND INDUSTRIAL USES	----	---	---	3	---	---	---	---	---	---	---	---	---

CODE	INDICATORS	ROYAL COMMISSION (RCFTW) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-REC	DENSITY & DESIGN NOT TO CREATE VISUAL BARRIERS	----	----	---	---	1	---	---	---	---	---	---	---	---
HA-REC	INCREASE IN OPEN SPACES	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	CREATION OF OPEN , UNOBSTRUCTED VIEWS	----	----	---	---	1	---	---	---	---	---	---	---	---
HA-REC	PUBLIC EDUCATION RE: ENVI. ISSUES	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	GREEN STRATEGY EDUCATION	----	----	---	---	3	---	---	---	---	---	---	---	---
HA-REC	ENVIRONMENTALLY FRIENDLY BUSINESS ACTIVITY	----	----	---	---	3	---	---	---	---	---	---	---	---
HA-REC	BRING PUBLIC "CLOSER TO NATURE"	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	CONTINUOUS TRAIL SYSTEMS	----	----	---	---	3	---	---	---	---	---	---	---	---
HA-REC	GREEN CORRIDORS	----	----	---	---	1	---	---	---	---	---	---	---	---
HA-REC	PLANNING EMPHASIZING CONNECTEDNESS TO NATURAL	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	AND CULTURAL HERITAGE	----	----	---	---	1	---	---	---	---	---	---	---	---
HA-REC	CONNECTEDNESS RE: ACCESS TO FACILITIES	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	AFFORDABLE TO ALL INCOME GROUPS	----	----	---	---	2	---	---	---	---	---	---	---	---
HA-REC	CREATION OF LOW COST OR FREE ACTIVITIES	----	----	---	---	1	---	---	---	1	---	---	---	---
HA-REC	PROTECT VIEWS/VISTAS OF THE LAKE	----	----	---	---	2	---	---	---	2	---	---	---	---
HA-REC	INC AMOUNT OF GREEN SPACE/SCENERY	----	----	---	---	1	---	---	---	1	---	---	---	---
HA-REC	EXISTENCE OF INDUSTRIAL BASE	----	----	---	---	1	---	---	---	1	---	---	---	---
HA-REC	SAFETY	----	----	---	---	3	---	---	---	3	---	---	---	---
HA-REC	DEVELOPMENT OF DESIREABLE PASSIVE/ACTIVE EVENTS	----	----	---	---	3	---	---	---	3	---	---	---	---
HA-REC	INCLUSION OF ATTRACTIVE OPEN SPACES	----	----	---	---	2	---	---	---	2	---	---	---	---
HA-REC	REC. ACTIVITIES WHICH GENERATE JOBS/CAPITAL	----	----	---	---	---	---	---	---	---	---	---	---	---

TOTAL:	146	146	34	16	13	24	56	3	21	8	8	17	-4
WEIGHTED AVERAGE:	30	30	7	3	3	5	11	1	4	2	2	3	-1
STAKEHOLDER WEIGHTS (FROM TABLE 1):	54	44	53	34	36	41	39	35	42	30	37	37	29
(STAKEHOLDER WEIGHTS) x (WEIGHTED AVERAGE) =	1616	1316	369	111	96	202	448	22	181	49	61	129	-24
GAM TOTAL FOR RCFTW =		4575											

NOTE: 1. GOALS [CL=CLEAN, G=GREEN, U=USEABLE, D=DIVERSE, O=OPEN,
FEA=FOSTER ENVIRONMENTAL AWARENESS, C=CONNECTED, A=AFFORDABLE,
ATT=ATTRACTIVE, EPU=ENHANCE PORT USE, ED=ECONOMIC DEVELOPMENT,
AT=ATTRACT TOURISTS, SQO=STATUS QUO OWNERSHIP]

Table 5.3: GAM for the THC Proposal

CODE	INDICATORS	TORONTO HARBOUR COMMISSION (THC) PROPOSAL EVALUATION USING												
		VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EP	ED	AT	SQO
HA-SI	DECREASE IN LEVELS OF CONTAMINANTS IN SOIL,	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	AIR, WATER, WHICH IMPAIR USE/ HABITATION AS PER	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	MOE STANDARDS FOR EFFLUENTS AND OUTFLOW	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	MONITORING	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	ADHERENCE TO DEPT. OF HEALTH STANDARDS FOR	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	DRINKING WATER AND BATHING BEACH OPENINGS; LOW	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	FECAL COLIFORM BACTERIA COUNTS, ETC.	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF OPEN BEACHES	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF WATER RECREATION USERS	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN FINANCIAL INVESTMENT IN SOIL	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	DECOMMISSIONING	2	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF AQUATIC INDICATORS; DECREASE	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	IN # OF FISH WITH TUMORS OR DEFORMITIES;	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	DECREASE IN TOXIN LEVELS IN FISH AS PER MNR	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	STANDARDS; INCREASED # OF FISH SUITABLE FOR	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	CONSUMPTION	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	IMPROVED VISUAL AESTHETICS; ABSENCE OF GARBAGE,	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	OIL AND GREASE; ABSENCE OF ALGAE	1	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN NATURAL VEGETATION, EG. # OF	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	TREES PLANTED	---	2	----	---	---	---	---	---	---	---	---	---	---
HA-SI	MAINTENANCE OF WILDSpace; NATURAL HABITAT,	---	----	---	---	---	---	---	---	---	---	---	---	---
HA-SI	SENSITIVE AREAS	---	2	----	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN SPECIES DIVERSITY	---	2	----	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN INDICATOR SPECIES	---	2	----	---	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF PUBLIC PARKS	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF CLEAN, SAFE BEACHES	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	PRESENCE OF WHEELCHAIR ACCESS RAMPS	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN WATER-RELATED USES	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	PUBLIC ACCESSING PORT AREA VIA PUBLIC TRANSIT	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	EASE OF ACCESS: SENIORS, KIDS, STROLLERS	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF BIKES, FOOT PATHS	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	DIVERSE EXPERIENCES FOR PUBLIC	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN OPEN & GREEN SPACE	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	ACCESSIBILITY OF SHORELINE TO PUBLIC	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	PROVISION OF EDUCATIVE RESOURCES	---	----	0	----	---	---	---	---	---	---	---	---	---
HA-SI	# OF BUSIN. INVOLVED IN CONSERVATION	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	# OF PEOPLE ATTENDING SEMINARS RE: ENV. ISSUES	---	----	0	----	---	---	---	---	---	---	---	---	---
HA-SI	# OF KM OF CONNECTED BIKE & FOOT PATHS	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	CONTINUITY OF WILDLIFE CORRIDORS	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	ACCESSIBILITY OF WATERFRONT TO ALL INCOME GRPS	---	----	3	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN TAXES/ SOCIAL COSTS	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	BALANCE OF NATURAL & BUILT HERITAGE	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	POST-PROJ. MEASURES OF USER PERCEPTION	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	INC. IN # OF WATER-RELATED TRANSPORT ACTIVITIES	---	----	3	----	---	---	---	---	---	---	---	---	---
HA-SI	ACCESSIBILITY OF SHORE TO COMM. & REC. VESSELS	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN JOBS	---	----	3	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN STANDARD OF LIVING FOR AREA POP	---	----	3	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN # OF TOURISTS USING AREA	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	INCREASE IN TOURISM-RELATED BUSINESS	---	----	1	----	---	---	---	---	---	---	---	---	---
HA-SI	MAINTENANCE OF CURRENT OWNERSHIP PRIVILEGES	---	----	2	----	---	---	---	---	---	---	---	---	---
HA-SI	REDUCTION OF EMISSIONS FROM AUTOMOBILES	-1	----	---	---	---	---	---	---	---	---	---	---	---

		TORONTO HARBOUR COMMISSION (THC) PROPOSAL EVALUATION USING												
		VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
CODE	INDICATORS	CL	G	U	D	O	FEA	C	A	ATT	ED	AT	SQO	
HA-HI	REDUCTION OF EMISSIONS FROM PORT INDUSTRIES	0	---	---	---	---	---	---	---	---	---	---	---	
HA-HI	SOIL DECONTAMINATION TO DECREASE POSS OF HEAVY-	2	---	---	---	---	---	---	---	---	---	---	---	
HA-HI	WATER QUALITY IMPROVEMENT RE: FECAL COLIFORM	0	---	---	---	---	---	---	---	---	---	---	---	
HA-HI	GENERAL IMPROVEMENT OF ECOSYSTEM HEALTH	---	1	---	---	---	---	---	---	---	---	---	---	
HA-HI	AREA USED BY TOTAL POP: INCL. HANDICAPPED ETC.	---	---	0	---	---	---	---	---	---	---	---	---	
HA-HI	ADEQUATE SAFETY FEATURES TO PREVENT ACCID/CRIME	---	---	0	---	---	---	---	---	---	---	---	---	
HA-ECO	GROWTH IN EMPLOYMENT	---	---	---	---	---	---	---	---	---	3	---	---	
HA-ECO	GROWTH IN INCOME/PROFITS	---	---	---	---	---	---	---	---	---	3	---	---	
HA-ECO	SECTORAL COMPOSITION OF LIGHT TO HEAVY	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	INDUSTRY ON THE WATERFRONT	---	---	2	---	---	---	---	---	---	---	---	---	
HA-ECO	LORENTZ TYPE ANALYSIS SHOWING WHAT PERCENTAGE	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	OF USERS FALL WITHIN WHAT PERCENTAGE OF INCOME	---	---	1	---	---	---	---	---	---	---	---	---	
HA-ECO	AVERAGE EMISSION LEVELS/\$ OUTPUT PRODUCED ON	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	THE WATERFRONT	0	0	---	---	---	---	---	---	---	---	---	---	
HA-ECO	MEETING MOE STANDARDS ON LEVLE OF CONTAMINANTS	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	PRESENT ON THE WATERFRONT	2	2	---	---	---	---	---	---	---	---	---	---	
HA-ECO	% CHANGE IN GREEN INDUSTRY AS PERCENTAGE OF	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	RATIO TO WATERFRONT ECONOMY	1	1	---	---	---	---	---	---	---	---	---	---	
HA-ECO	CHANGE IN THE NUMBER OF OWNERS OF WATERFRONT	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	PROPERTY (MORE OWNERS ARE SEEN AS NEGATIVE, AS	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	IT LEADS TO LESS ABILITY TO PLAN	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	COMPREHENSIVELY WHILE INCREASING UNCERTAINTY	---	---	---	---	---	---	---	---	---	---	---	0	
HA-ECO	% CHANGE IN SHIPING TONNAGE	---	---	---	---	---	---	---	---	2	---	---	---	
HA-ECO	CHANGE IN LAND VALUES (INCREASE IS SEEN AS	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	NEGATIVE IMPACT, LIMITING INDUSTRY TO GROW IN	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	AREA	---	---	---	---	---	---	2	---	---	---	---	---	
HA-ECO	COMPOSITE FIGURE MEASURING AVERAGE COST OF	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	DAY'S ACTIVITIES	---	---	---	---	---	---	-2	---	---	---	---	---	
HA-ECO	\$ SPENT BY WATERFRONT INDUSTRY ON ENVIROMENTAL	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	R&D, AND PUBLIC EDUCATION CAMPAIGNS	---	---	---	---	0	---	---	---	---	---	---	---	
HA-ECO	GROWTH OF ECONOMIC VALUE OF THE SECTOR	---	---	---	---	---	---	---	---	---	---	3	---	
HA-ECO	% CHANGE OF EMPLOYMENT LEVELS GENERATED ON THE	---	---	---	---	---	---	---	---	---	---	---	---	
HA-ECO	WATERFRONT, DERIVED FROM TOURISM	---	---	---	---	---	---	---	---	---	---	1	---	
AB-SLS	FOSTER COMPLIANCE W MOE SOILS GUIDELINES	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	PROMOTE ENV. FRIENDLY INDUSTRIAL DEVLPMT	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	REDUCE ADVERSE IMPACTS ON TERRESTRIAL SPECIES	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	REDUCE POSSIBLE ADVERSE IMPACTS ON HUMAN HLTH	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	REDUCE GROUNDWATER CONTAMINATION FROM POLL.SOIL	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	REDUCE SOIL POLLUTION THRU REMEDIATION STRATEGY	2	2	---	---	---	---	---	---	---	---	---	---	
AB-SLS	INC POSS OF EXPANDING GREEN AREAS THRU REMED ST	1	1	---	---	---	---	---	---	---	---	---	---	
AB-SLS	COST CONSIDERATIONS RELEVANT TO REMED STRATEGY	2	2	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: TOTAL SUSPENDED PARTICULATES (TSP)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: SULFUR DIOXIDE (SO2)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: CARBON MONOXIDE (CO)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: NITROGEN DIOXIDE (NO2)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: PHOTOCHEMICAL OXIDANTS (PCOs)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	AIR: NON-METHANE HYDROCARBONS (HC)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	WATER: 5 DAY BIOLOGICAL OXYGEN DEMAND (BOD5)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	WATER: TOTAL SUSPENDED SOLIDS (TSS)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	WATER: PHOSPHOROUS (P)	0	---	---	---	---	---	---	---	---	---	---	---	
HA-WST	SOLID: QUANTITY (IN TONS)	0	---	---	---	---	---	---	---	---	---	---	---	

CODE	INDICATORS	TORONTO HARBOUR COMMISSION (THC) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-WST	WASTE REDUCING TECHNOLOGIES	---	0	---	---	---	---	---	---	---	---	---	---	---
HA-WST	WASTE CLEANUP/REMEDIAL ACTION	---	3	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ATTEMPTS TO INCREASE PUBLIC AWARENESS ABOUT	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ENVIRONMENT AND THE THE IMPACT OF WASTE ON THE	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-WST	ENVIRONMENT	---	---	---	---	---	0	---	---	---	---	---	---	---
BI-CWS	USE OF INDICATOR SPECIES IN BIOMONITORING	1	---	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR QUALITY & QUANTITY OF GREEN SPACES	---	1	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	EVALUATE PROPORTION OF NATURAL TO MANICURED SPA	---	1	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR GEN HEALTH OF ECOLOGICAL COMMUNITIES	---	1	---	---	---	---	---	---	---	---	---	---	---
BI-CWS	WATERFRONT APPEAL TO MULTIPLE USERS ESP NAT'LISTS	---	---	1	---	---	---	---	---	---	---	---	---	---
BI-CWS	ACCOMMODATE NEEDS OF TOTAL POP INCL HANDICAPPED	---	---	1	---	---	---	---	---	---	---	---	---	---
BI-CWS	MONITOR USE OF AREA W SURVEYS	---	---	1	---	---	---	---	---	---	---	---	---	---
BI-CWS	DIVERSE USE OF AREA: PUBLIC & PRIVATE	---	---	---	1	---	---	---	---	---	---	---	---	---
BI-CWS	CONSTRUCTION OF TRAIL SYSTEM W MAX WATER ACCESS	---	---	---	---	1	---	---	---	---	---	---	---	---
BI-CWS	INCREASE PUBLIC TRANSIT & PARKING IN AREA	---	---	---	---	---	0	---	---	---	---	---	---	---
BI-CWS	NETWORK OF BIKE/FOOT PATHS RESPECTING WILDLIFE	---	---	---	---	---	---	1	---	---	---	---	---	---
BI-CWS	ACCESS BY TOTAL POP INCL AGED & HANDICAPPED	---	---	---	---	---	---	1	---	---	---	---	---	---
BI-CWS	CONTINUOUS TRAILS TO LINK ENTIRE WATERFRONT	---	---	---	---	---	---	1	---	---	---	---	---	---
HA-BH	CONTAMINANT FREE	2	2	---	---	---	---	---	---	---	---	---	---	---
HA-BH	ENVIRONMENTALLY FRIENDLY: FORM & FUNCTION	0	0	---	---	---	---	---	---	---	---	---	---	---
HA-BH	PRESERVE HISTORIC BUILDINGS	1	1	---	---	---	---	---	---	---	---	---	---	---
HA-BH	SENSITIVE ADAPTIVE RE-USE	0	0	---	---	---	---	---	---	---	---	---	---	---
HA-BH	% OF HERITAGE SITES	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	SURFACE WATER QUALITY: LEVEL OF PHOSPHOROUS OR	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	NITROGEN	0	---	---	---	---	---	---	---	0	---	---	0	---
AB-WQ	SURFACE WATER QUALITY: BACTERIAL	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	CONTAMINATION	0	---	---	---	---	---	---	---	0	---	---	0	---
AB-WQ	SURFACE WATER QUALITY: LEVEL OF TURBIDITY AND	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	TOTAL SUSPENDED SOLIDS	0	---	---	---	---	---	---	---	0	---	---	0	---
AB-WQ	SURFACE WATER QUALITY: CONCENTRATION OF	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	HEAVY METALS	0	---	---	---	---	---	---	---	0	---	---	0	---
AB-WQ	SURFACE WATER QUALITY: CONCENTRATION OF ORGANIC	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	CONTAMINANTS	0	---	---	---	---	---	---	---	0	---	---	0	---
AB-WQ	GROUND WATER QUALITY: CONC. OF PHENOL	---	1	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF VOC	---	1	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF PCB	---	1	---	---	---	---	---	---	---	---	---	---	---
AB-WQ	GROUND WATER QUALITY: CONC. OF HEAVY METALS	---	1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	CO	-2	-2	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	DUST	0	0	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	SUSPENDED PARTICULATE	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	ODOUR	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	NOISE	1	1	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	SOIL CONTAMINATION (AFFECTS INDOOR AIR	---	---	---	---	---	---	---	---	---	---	---	---	---
AB-AQ	QUALITY)	2	2	---	---	---	---	---	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: VASCULAR PLANTS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: RARE PLANTS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: INVERTEBRATES	0	0	---	---	---	---	0	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: AMPHIBIANS & REPTILES	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-TER	SPECIES DIVERSITY: MAMMALS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: VASCULAR PLANTS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: RARE PLANTS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---

CODE	INDICATORS	TORONTO HARBOUR COMMISSION (THC) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EP	ED	AT	SQO
BI-TER	POP/N ABUNDANCE: INVERTEBRATES	0	0	---	---	---	---	0	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: AMPHIBIANS & REPTILES	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: MAMMALS	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	POP/N ABUNDANCE: NUISANCE SPECIES	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: SEMI-BARE GRND/RECENT FILL	2	2	---	---	---	---	2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: OPEN FIELD	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: PRE-WOODLAND	-1	-1	---	---	---	---	-1	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: COTTONWOOD WOODLAND	0	0	---	---	---	---	0	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: BEACH & GRAVEL SHORELINE	3	3	---	---	---	---	3	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: WET MEADOW/MARSH	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: WILLOW THICKETS	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-TER	NATURAL SUCCESSION: MANICURED LANDS	3	3	---	---	---	---	3	---	---	---	---	---	---
BI-TER	ORGANISM HEALTH: REDUCTION OF VISIBLE GARBAGE	-2	-2	---	---	---	---	-2	---	---	---	---	---	---
BI-AE	GREATER SPECIES DIVERSITY	-2	-2	---	---	---	---	---	---	---	---	---	---	---
BI-AE	TYPES OF SPECIES (MORE DESIRABLE)	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	GREATER ABUNDANCE OF LIFE	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	DON RIVER CLEAN UP & REGENERATION OF AREA	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN SEDIMENTS	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN CLAMS	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN YOY SHINERS	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN SPORT FISH	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	FEWER CONTAMINANTS IN FISH-EATING BIRDS	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE IN PARKS	-2	-2	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE AROUND INDUSTRY	1	1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS VISIBLE GARBAGE IN ALGAE	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS BACTERIA AT C. BEACH (MORE SWIMMING)	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	GREATER HABITAT DIVERSITY	1	1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	SUITABLE FISH HABITAT	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	SUITABLE THERMAL VARIATION FOR FISH	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	LESS SUSPENDED SEDIMENTS	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE TRAFFIC CREATING DISTURBANCE IN SUMMER	-3	-3	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE TRAFFIC CREATING DISTURBANCE IN WINTER	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE DISTURBANCES FROM SHIPPING	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	MORE DISTURBANCES FROM DREDGING	0	0	---	---	---	---	---	---	---	---	---	---	---
BI-AE	DECREASED INDUSTRIAL EMISSIONS	1	1	---	---	---	---	---	---	---	---	---	---	---
BI-AE	RECREATIONALISTS	-3	-3	---	---	---	---	---	---	---	---	---	---	---
HA-REC	SOIL REMEDIATION	2	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	AIR QUALITY FOR RECREATION ACTIVITIES	0	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	WATER QUALITY FOR RECREATION ACTIVITIES	-1	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	DEGREE OF POLLUTING INDUSTRIES	-1	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	INCREASING OPEN GREEN SPACES OR PARKLAND	---	1	---	---	---	---	---	---	---	---	---	---	---
HA-REC	PROTECT AND RESTORE ECOLOGICAL COMMUNITIES FOR	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	FISHING, BIRDING, NATURALISTS	---	0	---	---	---	---	---	---	---	---	---	---	---
HA-REC	AMOUNT OF INDUSTRY PRESENT	---	0	---	---	---	---	---	---	---	---	---	---	---
HA-REC	ACTIONS THAT PERMIT PUBLIC ACCESS, USE & ENJOY-	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-REC	MENT OF WATER'S EDGE	---	---	1	---	---	---	---	---	---	---	---	---	---
HA-REC	PROMOTE GREATER YEAR ROUND USE	---	---	0	---	---	---	---	---	---	---	---	---	---
HA-REC	AMENABLE TO TOTAL POP INCL DISABLED	---	---	0	---	---	---	---	---	---	---	---	---	---
HA-REC	PROVIDE DIVERSE EXPERIENCES TO PUBLIC	---	---	0	---	---	---	---	---	---	---	---	---	---
HA-REC	ACTIVITIES OTHER THAN SPORTS ONLY	---	---	0	---	---	---	---	---	---	---	---	---	---
HA-REC	INTENSIFY PORT AND INDUSTRIAL USES	---	---	-1	---	---	---	---	---	---	---	---	---	---

CODE	INDICATORS	TORONTO HARBOUR COMMISSION (THC) PROPOSAL EVALUATION USING VALUES FROM -3 TO +3 FOR THE 13 GOALS AND/OR OBJECTIVES												
		CL	G	U	D	O	FEA	C	A	ATT	EPU	ED	AT	SQO
HA-REC	DENSITY & DESIGN NOT TO CREATE VISUAL BARRIERS	---	---	---	---	1	---	---	---	---	---	---	---	---
HA-REC	INCREASE IN OPEN SPACES	---	---	---	---	1	---	---	---	---	---	---	---	---
HA-REC	CREATION OF OPEN , UNOBSTRUCTED VIEWS	---	---	---	---	1	---	---	---	---	---	---	---	---
HA-REC	PUBLIC EDUCATION RE: ENVI. ISSUES	---	---	---	---	0	---	---	---	---	---	---	---	---
HA-REC	GREEN STRATEGY EDUCATION	---	---	---	---	1	---	---	---	---	---	---	---	---
HA-REC	ENVIRONMENTALLY FRIENDLY BUSINESS ACTIVITY	---	---	---	---	1	---	---	---	---	---	---	---	---
HA-REC	BRING PUBLIC "CLOSER TO NATURE"	---	---	---	---	0	---	---	---	---	---	---	---	---
HA-REC	CONTINUOUS TRAIL SYSTEMS	---	---	---	---	---	---	1	---	---	---	---	---	---
HA-REC	GREEN CORRIDORS	---	---	---	---	---	---	0	---	---	---	---	---	---
HA-REC	PLANNING EMPHASIZING CONNECTEDNESS TO NATURAL	---	---	---	---	---	---	1	---	---	---	---	---	---
HA-REC	AND CULTURAL HERITAGE	---	---	---	---	---	---	0	---	---	---	---	---	---
HA-REC	CONNECTEDNESS RE: ACCESS TO FACILITIES	---	---	---	---	---	---	---	-1	---	---	---	---	---
HA-REC	AFFORDABLE TO ALL INCOME GROUPS	---	---	---	---	---	---	---	1	---	---	---	---	---
HA-REC	CREATION OF LOW COST OR FREE ACTIVITIES	---	---	---	---	---	---	---	---	1	---	---	---	---
HA-REC	PROTECT VIEWS/VISTAS OF THE LAKE	---	---	---	---	---	---	---	---	1	---	---	---	---
HA-REC	INC AMOUNT OF GREEN SPACE/SCENERY	---	---	---	---	---	---	---	---	-2	---	---	---	---
HA-REC	EXISTENCE OF INDUSTRIAL BASE	---	---	---	---	---	---	---	---	-1	---	---	---	---
HA-REC	SAFETY	---	---	---	---	---	---	---	---	---	1	---	---	---
HA-REC	DEVELOPMENT OF DESIREABLE PASSIVE/ACTIVE EVENTS	---	---	---	---	---	---	---	---	---	1	---	---	---
HA-REC	INCLUSION OF ATTRACTIVE OPEN SPACES	---	---	---	---	---	---	---	---	---	---	2	---	---
HA-REC	REC. ACTIVITIES WHICH GENERATE JOBS/CAPITAL	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL:		16	26	18	4	6	3	-5	4	1	9	11	6	2
WEIGHTED AVERAGE:		16	26	18	4	6	3	-5	4	1	9	11	6	2
STAKEHOLDER WEIGHTS (FROM TABLE 1):		54	44	53	34	36	41	39	35	42	30	37	37	29
[STAKEHOLDER WEIGHTS] x [WEIGHTED AVERAGE] =		855	1133	945	135	214	122	-193	139	42	267	403	220	57
GAM TOTAL FOR THC =		4337												

NOTE: 1. GOALS [CL=CLEAN, G=GREEN, U=USEABLE, D=DIVERSE, O=OPEN,
FEA=FOSTER ENVIRONMENTAL AWARENESS, C=CONNECTED, A=AFFORDABLE,
ATT=ATTRACTIVE, EPU=ENHANCE PORT USE, ED=ECONOMIC DEVELOPMENT,
AT=ATTRACT TOURISTS, SQO=STATUS QUO OWNERSHIP]

6. RECOMMENDATIONS

1. We support the recommendations of the Royal Commission on the Future of the Toronto Waterfront, specifically, under area-specific issues, the recommendations for the East Bayfront/Port Industrial Area, as addressed in Watershed: Interim Report August 1990.

We emphasize the need for specific provisions regarding budget and temporal parameters for the implementation of the recommendations.

The Royal Commission's recommendations address the future of the Port of Toronto and the Toronto Harbour Commission, new waterfront parklands, a new waterfront industrial park, and a Toronto waterfront regeneration land trust.

In summary, the Royal Commission upholds the use of the Port of Toronto as a regional port and the Toronto Harbour Commission retain the overall responsibility for harbour related operations and maintenance.

Waterfront parklands should be expanded and conveyed to the City of Toronto, including the expansion of Cherry Beach to 200 acres, the creation of a continuous waterfront promenade, and the creation of a Don Valley Wildlife Corridor.

A new waterfront industrial park would be located in the East Bayfront/Port Industrial Area, north and east of the Ship Channel and east of the Don Valley Wildlife Corridor, under the authority of the Toronto Economic Development Corporation, and to include the promotion of environmentally friendly and/or related industries, and the creation of a Centre for Green Enterprise and Technology.

The Toronto Waterfront Regeneration Land Trust, incorporating lands located north and west of the Ship Channel and west of the Don Valley Wildlife Corridor, would be responsible for an environmental audit of the area, the remediation of all lands under the Land Trust, and provide for a future mixed use strategy. In addition, the Land Trust would coordinate the regeneration of contaminated lands along the Greater Toronto Waterfront.

Recommendations that we have put forward and that are addressed in the Royal Commission include:

2. That the Toronto Harbour Commission continue as Port of Toronto operator and developer.
3. That the Port of Toronto maintain an industrial base.
4. That the remediation of contaminated soils be initiated and coordinated by a Land Trust.

5. That clean and green industry be promoted as a Port Industrial Area initiative.

6. That the Remedial Action Plan (RAP) strategy be promoted and expanded to represent a joint responsibility of all stakeholders to develop and implement a RAP for the regional watershed.

Recommendations that we have put forward and are not identified in the Royal Commission are:

7. That the formation of an independent Land Trust, funded and coordinated by current tenants and landowners in the Port Industrial Area, the Toronto Harbour Commission and the Province of Ontario, for the remediation of the soils not addressed by the Toronto Regeneration Land Trust, to a level deemed acceptable for industrial lands by the Ministry of Environment by the year 2000.

8. That human and non-human waterfront accessibility be promoted through the maximization of natural green space, re-creation of marshland habitat, and preservation of the Leslie Street Spit.

9. That public transportation linkages to the Port

Industrial Area be initiated and maintained by the Toronto Transit Commission.

9. That Metropolitan Toronto stringently apply and enforce the sewer-use by-law currently in place.
10. That a Nature/Wildlife Interpretive Centre be established in the Port Industrial Area, under the responsibility of the Metropolitan Toronto and Region Conservation Authority.
11. That the public consultation process be adhered to for all aspects of the remediation and future planning of the Port Industrial Area.

7. REFERENCES

- Jones, M. & Greig, L.A. (1985): "Adaptive Environmental Assessment and Management. A New Approach to Environmental Impact Assessment". In: Whitney, J.B.R. & Maclaren, V.W. (eds.): New Directions in Environmental Impact Assessment in Canada: 21-42. Toronto: Methuen.
- Rees, W.E. (1988): "A Role for Environmental Assessment in Achieving Sustainable Development". Environmental Impact Assessment Review 1988, 8: 273-291.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (August 1989): Interim Report.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (April 1990): Environment in Transition: A Report on Phase 1 of an Environmental Audit of Toronto's East Bafront and Port Industrial Area.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (May 1990): Aquatic Environment. Environmental Audit of the East Bayfront/Port Industrial Area. Phase 1. Working Paper.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (May 1990): Natural Heritage. Environmental Audit of the East Bayfront/Port Industrial Area. Phase 1. Working Paper.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (August 1990): Watershed. Interim Report.
- Royal Commission on the Future of the Toronto Waterfront RCFTW (October 1990): Natural Heritage. Environmental Audit of the

East Bayfront/Port Industrial Area. Phase 1. Technical Paper.
Toronto Harbour Commissioners THC (1988): Port Industrial Area
Concept Plan. Discussion Paper. Toronto.

World Commission on Environment and Development (1987): Our Common
Future. 1. Economic Development - Environmental Aspects.
Oxford University Press.

TABLE OF CONTENTS

1. INTRODUCTION	2
1.1 Background and Project Description	2
2. THE PROPOSAL FOR THE TUMBUKTAI WASTE TREATMENT	3
2.1 The High Commission for the Future of the Tumbuka Valley	3
2.2 The Tumbuka Harbour Commission	3
3. TERRESTRIAL ECOLOGY	4
3.1 INTRODUCTION	4
3.2 CURRENT OPERATIONS AFFECTING THE RELEVANT ZONES	4
3.3 IMPACT ANALYSIS	4
3.3.1 Species Diversity	4
3.3.2 Aquatic Diversity	4
3.3.3 Terrestrial Diversity	4
3.3.4 Aquatic Flora	4
3.4 CONCLUSIONS	15
4. RECOMMENDATIONS	16
4.1 WATER QUALITY	16
4.2 AIR QUALITY	16
4.3 SOIL QUALITY	16
4.4 NOISE	16
4.5 VIBRATION	16
4.6 CLIMATE	16
4.7 LAND USE	16
4.8 SOCIAL AND ECONOMIC	16
4.9 CULTURAL	16
4.10 VISUAL	16
4.11 OTHER	16
4.12 SUMMARY	16
4.13 CONCLUSIONS	16
4.14 RECOMMENDATIONS	16
4.15 REFERENCES	16
4.16 APPENDICES	16
4.17 GLOSSARY	16
4.18 INDEX	16
4.19 BIBLIOGRAPHY	16
4.20 REFERENCES	16
4.21 APPENDICES	16
4.22 GLOSSARY	16
4.23 INDEX	16
4.24 BIBLIOGRAPHY	16
4.25 REFERENCES	16
4.26 APPENDICES	16
4.27 GLOSSARY	16
4.28 INDEX	16
4.29 BIBLIOGRAPHY	16
4.30 REFERENCES	16
4.31 APPENDICES	16
4.32 GLOSSARY	16
4.33 INDEX	16
4.34 BIBLIOGRAPHY	16
4.35 REFERENCES	16
4.36 APPENDICES	16
4.37 GLOSSARY	16
4.38 INDEX	16
4.39 BIBLIOGRAPHY	16
4.40 REFERENCES	16
4.41 APPENDICES	16
4.42 GLOSSARY	16
4.43 INDEX	16
4.44 BIBLIOGRAPHY	16
4.45 REFERENCES	16
4.46 APPENDICES	16
4.47 GLOSSARY	16
4.48 INDEX	16
4.49 BIBLIOGRAPHY	16
4.50 REFERENCES	16
4.51 APPENDICES	16
4.52 GLOSSARY	16
4.53 INDEX	16
4.54 BIBLIOGRAPHY	16
4.55 REFERENCES	16
4.56 APPENDICES	16
4.57 GLOSSARY	16
4.58 INDEX	16
4.59 BIBLIOGRAPHY	16
4.60 REFERENCES	16
4.61 APPENDICES	16
4.62 GLOSSARY	16
4.63 INDEX	16
4.64 BIBLIOGRAPHY	16
4.65 REFERENCES	16
4.66 APPENDICES	16
4.67 GLOSSARY	16
4.68 INDEX	16
4.69 BIBLIOGRAPHY	16
4.70 REFERENCES	16
4.71 APPENDICES	16
4.72 GLOSSARY	16
4.73 INDEX	16
4.74 BIBLIOGRAPHY	16
4.75 REFERENCES	16
4.76 APPENDICES	16
4.77 GLOSSARY	16
4.78 INDEX	16
4.79 BIBLIOGRAPHY	16
4.80 REFERENCES	16
4.81 APPENDICES	16
4.82 GLOSSARY	16
4.83 INDEX	16
4.84 BIBLIOGRAPHY	16
4.85 REFERENCES	16
4.86 APPENDICES	16
4.87 GLOSSARY	16
4.88 INDEX	16
4.89 BIBLIOGRAPHY	16
4.90 REFERENCES	16
4.91 APPENDICES	16
4.92 GLOSSARY	16
4.93 INDEX	16
4.94 BIBLIOGRAPHY	16
4.95 REFERENCES	16
4.96 APPENDICES	16
4.97 GLOSSARY	16
4.98 INDEX	16
4.99 BIBLIOGRAPHY	16
4.100 REFERENCES	16

Nina-Marie Lister

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

TABLE OF CONTENTS

1.0 INTRODUCTION	2
1.1 Sustainable Development Principles	2
2.0 TWO PROPOSALS FOR THE TORONTO WATERFRONT	2
2.1 The Royal Commission on the Future of the Toronto Waterfront	2
2.2 The Toronto Harbour Commissioners	3
3.0 GOALS	4
4.0 CRITERIA: OPERATIONALIZING THE RELEVANT GOALS	4
5.0 IMPACT ANALYSIS	5
5.1 Species Diversity	5
5.2 Population Abundance	8
5.3 Natural Succession	9
5.4 Organism Health	12
6.0 EVALUATION	13
7.0 RECOMMENDATIONS	14
8.0 REFERENCES	15
9.0 APPENDIX	16

Figure 9.1: Components of the Waterfront Ecosystem

Figure 9.2: Royal Commission on the Future of the Toronto Waterfront: Land Use Proposal for the East Bayfront & Port Industrial Lands

Figure 9.3: The Toronto Harbour Commissioners: Port Industrial Area Concept Plan

Figure 9.4: Food Web of the Waterfront Biotic System

1.0 INTRODUCTION

The purpose of this report is to provide an analysis of the terrestrial ecology component of the biotic sub-model of an environmental assessment (EA) of the Toronto waterfront area.

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

The EA deals specifically with two proposals for the Toronto East Bayfront and Port Industrial lands put forth by the Royal Commission on the Future of the Toronto Waterfront (RCFTW) and the Toronto Harbour Commissioners (THC). This component of the EA analyzes the potential impacts of each proposal on the terrestrial ecology of the area under assessment. Although the analysis focuses on a specific area of the waterfront, it must be emphasized that the terrestrial ecology component, like all other environmental components, is ultimately affected by the surrounding ecosystem. Figure 9.1 demonstrates the basic relationships within the Greater Toronto Area bioregion.

Following the impact analysis, each proposal is evaluated and recommendations are made for improvements to the favoured proposal in keeping with the definition of sustainable development provided in this report.

1.1 Sustainable Development Principles

This EA has been conducted within the context of the principles of sustainable development. Although it is recognized that there are many interpretations of this concept, a working definition has been developed for the purposes of this EA. Therefore, in this report, sustainable development is recognized as:

The minimization of adverse impacts on the environment.

This definition is used as a measure of success in the impact analysis and evaluation sections as well as a basis for further recommendations.

2.0 TWO PROPOSALS FOR THE TORONTO WATERFRONT

2.1 The Royal Commission on the Future of the Toronto Waterfront

The Royal Commission on the Future of the Toronto Waterfront (RCFTW) was set up in 1988 by order of the Prime Minister to make recommendations for the Greater Toronto Area Waterfront from Burlington to Port Hope. Stemming from an environmental audit and research of the area's present uses, the second interim report of the RCFTW makes 80 recommendations for the use and control of the waterfront lands, of which 8 are directly related to the East Bayfront and Port Industrial lands, and 5 are indirectly related, as they concern the role and function of the THC.

Essentially, the RCFTW proposes changes to existing land use and control by means of these 13 recommendations. The proposed major changes include:

- * the consolidation of ownership and the re-organization of the THC to allow for greater public accountability and a clearer mandate;
- * the creation of extensive new natural waterfront parklands including the expansion of Cherry Beach park, establishment of a continuous waterfront promenade, establishment of the

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

Don Valley Wildlife Corridor, and several other linkages between existing parklands;

- * the creation of a waterfront industrial park by the Toronto Economic Development Corporation (TEDCO) in order to foster economic development in the area; and
- * the creation of the Toronto Waterfront Regeneration Land Trust, in order to remediate and regenerate the presently contaminated lands in both the immediate area and the Don Valley.

Figure 9.2 depicts the proposed land use changes by the RCFTW.

Those aspects of the RCFTW proposal which are most relevant to the terrestrial ecology component are concerned with the expansion of natural parklands, the development of an industrial park and the remediation of contaminated lands including the Don Valley. Details of the RCFTW proposal are elaborated in the 1990 Interim Report of the RCFTW, Watershed.

2.2 The Toronto Harbour Commissioners

Established under a federal Act in 1911, the Toronto Harbour Commissioners (THC) are the present authoritative body in the study area. Accordingly, the THC has developed a Concept Plan for the Port Industrial Lands. The major features of the THC Concept Plan for the waterfront area include:

- * improved use of the Port facilities through a refined and consolidated Port Area primarily south of the Ship Channel;
- * improved transit and circulation through relocated roads and rail alignments;
- * the creation of an enlarged waterfront park along Cherry Beach with links to the Outer Harbour Marina, Tommy Thompson Park (the Leslie Street Spit) and the Don Valley via manicured open spaces;
- * the creation of two business parks south of the Ship Channel and retail strips along Cherry and Leslie Streets; and
- * upgrading of the THC works facility and integrating open spaces for public enjoyment of the area.

Figure 9.3 depicts the proposed land use changes in the THC Concept Plan.

Those aspects of the THC Concept Plan which are most relevant to the terrestrial ecology component are the plans for manicured park expansion and increased light industrial activity through the creation of business parks. Details of the THC Concept Plan are elaborated in the March 1988 THC Discussion Paper: Port Industrial Area Concept Plan.

3.0 GOALS

The RCFTW lists 9 "principles" or goals which provide the basis for the recommendations, while the THC outlines 3 primary objectives. Not surprisingly, several of the goals and objectives of each proposal overlap. Therefore, for the purposes of the EA and this sub-model

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

component report, the goals have been consolidated into a single list of 13 goals:

- | | |
|-----------------------------------|--------------------------|
| 1. Clean | 8. Affordable |
| 2. Green | 9. Attractive |
| 3. Useable | 10. Enhance Port Use |
| 4. Diverse | 11. Economic Development |
| 5. Open | 12. Attract Tourists |
| 6. Connected | 13. Status Quo Ownership |
| 7. Foster Environmental Awareness | |

As defined by the proposals (THC Discussion Paper, 1988, and RCFTW Watershed, 1990), only 3 of the 13 goals are deemed directly relevant to the terrestrial ecology component. The 3 goals for which operationalizing criteria have been established and analyzed in this report are CLEAN, GREEN and CONNECTED.

4.0 CRITERIA: OPERATIONALIZING THE RELEVANT GOALS

In order to measure achievement towards the 3 selected goals, CLEAN, GREEN and CONNECTED, 4 criteria within the terrestrial ecology component have been identified. Each of these 4 criteria has been further subdivided into indicators which are specific to the study area. The criteria and their specific indicators have been used in section 5.0 (Impact Analysis) to determine the impacts of each of the 2 proposals on the terrestrial ecology component.

4 Criteria: Towards CLEAN, GREEN & CONNECTED

1. Species Diversity
 2. Population Abundance
 3. Natural Succession
 4. Organism Health
-

The 3 relevant goals, CLEAN, GREEN and CONNECTED, are deemed to be inter-dependent as they relate to the terrestrial ecology within the study area. If one goal, e.g. CLEAN is not achieved, a GREEN environment is precluded. Accordingly, a CONNECTED environment becomes irrelevant when it is neither CLEAN nor GREEN. Therefore, due to the holistic

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

nature of biotic relationships, both within the food web and in terms of habitat inter-dependence, it is essential that all goals be considered equal in importance. For this reason, all 4 criteria and their indicators are used to measure achievement towards all 3 goals. E.g.: Vascular plants are used as indicators of species diversity, which is considered a measure of both a CLEAN and GREEN environment, as well as that which well CONNECTED.

Figure 9.4 provides a good example of the inter-dependency within natural systems, through the depiction of basic biotic relationships within the food web of both the terrestrial and aquatic life in the Toronto Port Industrial lands.

5.0 IMPACT ANALYSIS

This section sub-divides each of the 4 criteria used to measure achievement towards the 3 goals into related indicators. The impacts of each proposal on each of the 4 criteria and indicators are briefly described and assigned an "impact value". These values range from -3 to 0 to +3, where the negative range indicates an increasingly negative impact away from the goals, and the positive range indicates an increasingly positive impact towards the goals. A value of 0 indicates no change in the existing baseline conditions.

5.1 Species Diversity

Species diversity is one of the primary criteria for a healthy ecosystem. An increase the genetic pool leads to diversity in and among native species, thereby enriching the food web and the available nutrient supplies. The following impact analysis shows that the potential impacts of each proposal on the diversity of species in the subject area are varied. Certainly the THC plans to manicure the parklands and to pursue light industrial activity will suppress and possibly lessen the richness of native species, particularly those requiring a more sensitive habitat. The RCFTW plans are likely more conducive to fostering species diversity, as the proposal calls for increased natural parklands and wildlife corridors between natural areas.

The five following indicators are known species present in the Port Industrial lands according to the Natural Heritage Technical Paper No. 3 (Phase 1), May 1990, RCFTW, and the second draft of the Natural Heritage Technical Paper (Phase 2), October 1990, RCFTW. (Birds are covered in the Aquatic Ecology Component of the Biotic Sub-Model Report.)

Indicators of Species Diversity

- a) Vascular plants
 - b) Rare plants
 - c) Invertebrates
 - d) Amphibians & Reptiles
 - e) Mammals
-

a) Vascular plants:

There are 311 recorded species of vascular plants in the Port Industrial Lands. The majority

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

occur in open fields, vacant lots, within Tommy Thompson Park on the Leslie Street Spit, at the base of the Spit, and on the north shore of the Outer Harbour. The vascular plant category includes both flowering and non-flowering plants, herbs, shrubs, woody vines and trees. Although some species are clearly more sensitive than others, the group as a whole is the most diverse of the known biota.

Impact value: RCFTW +3 THC -1

The RCFTW may have positive impacts on the vascular plant species as the proposal calls for increased natural areas linked by a series of natural corridors. Conversely, the THC plans may have negative impacts on the diversity of vascular plants due to impending habitat changes. The THC proposal to manicure parks will require the natural habitats of many of these species to be modified, thereby reducing the existing populations and potential for greater diversity among the sub-taxa. In areas such as the base of the Spit, which support many varieties of vascular plants, plans to relocate roads and convert the land to light industrial uses, suggest that a portion of the habitat for these species will be destroyed.

b) Rare plants:

There are 13 recorded species of regionally and provincially rare plants present in the study area: Nelson's horsetail, least pondweed, barnyard grass species, Englemann's umbrella-sedge, river bulrush, Richardson's rush, baltic rush, nodding ladies' tresses (a species of wild orchid), Great Lakes sea rocket, bushy cinquefoil, marsh hedge-nettle, narrow-leaved gerardia, and tall wormwood. The rare status of these plants warrants a separate impact analysis, although they share the same habitat as the rest of the flora studied.

Impact value: RCFTW +1 THC -1

The RCFTW proposal is seen to have only a slight positive impact on the diversity of rare plant species due to the limited habitat possibilities for a small number of such species. The THC plan will probably negatively impact the rare species as they are already fewer in number than the common species. Although most rare species occur on the Spit, which both proposals wish to leave in a natural state, any habitat change to the base of the Spit through the conversion or alteration of land uses will have direct impacts on these organisms.

c) Invertebrates:

The numbers of invertebrate species are too large to be accurately recorded. The observed species included 27 varieties of butterflies as well as moths, bees, wasps, flies, mites, ants, beetles, spiders, worms, centipedes, snails and slugs. These species are relatively adaptive dependent upon on habitat quality, and may be considered vital indicators for higher organisms. Similar to the plant families, invertebrates provide the foundation of the food web.

Impact value: RCFTW +1 THC 0

Due to the diversity of invertebrates already present, neither proposal is seen to have severe impacts. The RCFTW plans could potentially encourage a wider variety of invertebrates simply by increasing available habitat. Although the THC proposal may reduce the available natural areas, the reduction will probably not be sufficient enough to cause loss of diversity among the hardy invertebrates. These organisms colonize and adapt easily, and will likely remain largely unaffected by either plan.

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

d) Amphibians & Reptiles:

There are 7 recorded species presently in the Port Industrial lands. Amphibians found are the northern leopard frog and the american toad; reptiles found are the common snapping turtle, the map turtle, the painted turtle, the common garter snake and the brown snake. The frogs are abundant and tolerant of harsher conditions than are most amphibians. They are found near the shoreline and in semi-permanent ponds at the base of the Spit which is an area undergoing regeneration. There were only 2 toads observed at the base of the Spit and in a vacant lot inland. The reptiles are more diverse in species than the amphibians, yet there are fewer numbers observed. These populations are scattered mainly near and on the Spit. Evidence of a Garter snake hibernaculum at the base of the Spit in both surveys by the RCFTW Natural Heritage Group indicates that the species is actively colonizing the area.

Impact value: RCFTW +2 THC -2

The amphibian species are generally sensitive to change in habitat quality and respond quickly, while the reptiles are somewhat hardier. Nonetheless, the food web for these species depends largely upon a varied and healthy aquatic and invertebrate base. Therefore the THC proposal to develop the base of the Spit into a business park containing retail and light industry will likely have noticeable negative impacts on the amphibian and reptile populations and the potential for diversity.

e) Mammals:

There are 13 species of mammals presently observed in the discussion area. Most are small herbivores, yet there are also several higher carnivores. The mammalian species list includes: house mouse, meadow vole, white-footed mouse, eastern grey squirrel, red bat, big brown bat, eastern cottontail, groundhog, raccoon, muskrat, domestic cat, and red fox. The mammal populations are largely restricted to the north shore of the Outer Harbour, the Spit and Cherry Beach area, although there have been observations in vacant lots and fields within the industrial areas. The smaller mammalian species generally rely on the lower trophic orders, while the larger carnivores will also feed on available refuse. Although most species are well-adapted to urban conditions and are adept foragers, they are still susceptible to habitat destruction.

Impact value: RCFTW +2 THC -2

The RCFTW proposal is considered to encourage greater diversity among the mammalian species as the food web enriches and a larger biota base is supported. Following an increase in natural areas, natural wildlife corridors will provide important routes between territories, breeding and foraging grounds. An increase in diversity of species will likely be dependent on spatial factors, as mammals require a greater variation and higher quality of habitat than do the lower trophic orders.

5.2 Population Abundance

The Population Abundance criterion shares the same indicators as species diversity. The abundance of existing populations is closely related to the potential for increased diversity, although abundance in only one species may indicate an unbalanced ecosystem. This report assumes that increases in natural areas will foster population increases in most existing species, while encouraging a diversity of species to maintain a healthy ecological balance. Given the

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

conceptual approach to the proposals, it is impossible to extrapolate further impacts. Therefore, the same impact values are assigned to the same indicators for this criterion as were assigned to the previous criterion, Species Diversity. The only addition under the Population Abundance criterion is the following:

Nuisance species: Herring gulls & Canada geese

The populations of these species are already disproportionate to the rest of the terrestrial ecology in the area under review. A sign of an unhealthy environment, these birds pollute the coastal waters and require the same food sources as many struggling populations. In this respect, the abundant bird species are considered a nuisance and are therefore obstacles to the goals CLEAN and GREEN.

Impact value: RCFTW +2 THC -2

The RCFTW plans to introduce control of nuisance species under the auspices of the Canadian Wildlife Service (CWS) is seen as a positive step in bringing the nuisance populations to a manageable and thus ecologically healthy level. The THC plans however, call for the increase of manicured green space which fosters an environment for the scavenger birds, thereby encouraging their presence along with the humans that aid in sustaining their numbers.

5.3 Natural Succession

A healthy ecosystem sustains a diverse variety of habitats which in turn, sustain a diversity of species with (ideally) abundant populations. Natural succession refers to the natural process of habitat evolution, whereby a habitat is successively colonized by a richer and usually more varied vegetation, followed logically by fauna species which require a more elaborate habitat. In this way, the Natural Succession criterion is the measure of the diversity and variety of the habitats within an ecosystem, and can therefore be used as a criterion of achievement for the relevant goals outlined in section 3.0. The RCFTW second draft of the Natural Heritage Technical Paper, (Phase 2) October 1990 lists 9 habitats for the Port Industrial lands, 8 of which are terrestrial. (The following descriptions of the habitats are summarized from the RCFTW technical paper.)

Port Industrial Lands Habitats

- a) Recent fill/semi-bare ground
 - b) Open field
 - c) Pre-woodland
 - d) Cottonwood woodland
 - e) Beach & gravel shoreline
 - f) Wet meadow/marsh
 - g) Willow thickets
 - h) Manicured lands
-

The 8 habitats represent the diversity of habitats in the study area. Specifically, habitats a) through d) are representative of progressive stages of natural succession, whereas habitats e),

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

f) and g) represent "water-related habitats with an increasing remoteness from water" (RCFTW second draft of the Natural Heritage Technical Paper, (Phase 2) October 1990, pg. 5) The final habitat (h) is representative of a human-made habitat and therefore demonstrates an area in which natural succession does not occur.

a) Recent fill/semi-bare ground:

Areas of recent fill and semi-bare ground are in the first stages of colonization and hold potential for hardy vegetation. Parts of the base of the Spit and several vacant lots are examples of such areas in early evolution, and contain a variety of plant life dependent upon micro-climate, drainage and soil composition and/or contamination. Areas rich in heavy metal contamination, notably cadmium and arsenic, exhibit poor to no plant life due to the high toxicity of the soils. Such polluted areas would clearly benefit from decommissioning of the soil and/or habitat re-creation.

Impact value: RCFTW +2 THC +2

Both proposals intend create more parkland, either by allowing natural processes to convert the land to a higher successional stage (RCFTW) or by creating a human-made parkland. For this reason, both proposals are considered to positively impact areas of recent fill, although by different means.

b) Open fields:

Well-drained open fields are also an early successional stage, exhibiting hardy field grasses, herbs and shrubs. Dependent upon the substrate composition, there is some variation in plant life. In general, flowering plants tend to dominate open fields in the late summer and early fall, providing food sources for butterflies and small mammals.

Impact value: RCFTW +1 THC -1

The RCFTW proposal is seen to have a slight positive impact due to the allowance of further natural succession which would increase both the species diversity and population abundance of communities in the open fields an later successional habitats. The THC proposal is considered to have slight negative impacts due to the potential conversion of open fields to either manicured parks or business parks.

c) Pre-woodlands:

The grasses and shrubs of open fields are replaced by larger shrubs, poplar and other small bushes or trees. Pre-woodland vegetation and fauna are observed at the base of the Spit and in vacant lots, as well as on the north shore of the Outer Harbour. The pre-woodland habitat is reportedly difficult to define however, and easily give way to mature woodland where older cottonwood stands are present. The value of pre-woodland habitats lies in their potential to develop into mature stands.

Impact value: RCFTW +1 THC -1

The RCFTW proposal is considered to impact the pre-woodland habitats slightly more positively than the THC, for the same reasons cited in b). Where natural succession is permitted to occur, the pre-woodlands will develop into a mature cottonwood woodlands sustaining a rich food web, which is diverse in biota.

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

d) Cottonwood woodlands:

The latest stage of succession observed in the Port Industrial lands is the mature cottonwood woodland. Usually an early phase of habitat evolution, the cottonwood woodland remains the oldest habitat due to the recent regeneration of the study area. Given more time and favourable, i.e. undisturbed conditions, these woodlands may develop into mixed woodlands containing a variety of mature complex vascular plants, especially larger trees. The mature woodlands in the waterfront lands, primarily Cherry Beach, the Spit and in few patches on the south side of Unwin Avenue, generally support a mixture of cottonwood, dogwood and several shrub species. Once common along the lakeshore, most of these woodlands have been destroyed due to urbanization.

Impact value: RCFTW 0 THC 0

Both proposals are considered to have no direct impact on the cottonwood woodlands. Due to the relative rarity of these habitats, it is assumed that the mature stands will be protected or at least minimally disturbed for the purposes of parkland. Both the RCFTW and the THC recommend increased parkland for the areas which are characterized by cottonwood stands, therefore it is not likely that these habitats will be destroyed or significantly altered.

e) Beach and gravel shoreline:

Beach habitats abound in the study area, and provide a significant portion of the available food sources and breeding areas for higher organisms. The shoreline areas do not generally support large populations of flora, but do contain a significant number of rare species. The shoreline habitats are most notable for their support of migratory waterfowl populations during the staging period of migration. (For details, consult the Aquatic Ecology Component of the Biotic Sub-Model Report.)

Impact value: RCFTW +3 THC+3

Both proposals are seen to have significantly positive impacts on beach habitats. The RCFTW and the THC both stipulate beach expansion and fostering of shoreline development. Along with improving existing conditions, both projects emphasize beach and shoreline park development.

f) Wet meadow/marsh:

Habitats characterized by standing water or seasonally flooded spaces occur largely at the base of the Spit and on the north shore of the Outer Harbour. Although the study area was once primarily marsh and bog land which was destroyed by the conversion to urban lands, the recent creation of the Leslie Street Spit has once again re-created these habitats. Wet meadows and marsh lands are home to large populations of waterfowl and amphibious species as well as marsh vegetation such as rushes, sedges and grasses. Marshlands are sensitive to environmental change and are important food and breeding areas for a large portion of the biota in the waterfront lands.

Impact value: RCFTW +2 THC -2

The RCFTW proposal will likely have a moderately positive impact on wetland areas, as the fostering of such regenerated natural areas is recommended. The THC however, will likely negatively impact these areas due to plans for light industry and business parks in the present wetland habitats.

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

g) Willow thickets:

Associated with the damp, windy shoreline of the lake, willow thickets are characterized by the presence of sandbar willow and several rare species of wetland plants. The largest and most visible habitat stretches from the base of the Spit along its northern shore, giving way to cottonwood woodlands as one moves inland away from the shoreline. Migrating waterfowl and amphibians richly populate the thickets.

Impact value: RCFTW +2 THC -2

As above in f), the RCFTW proposal is likely to foster the natural willow habitats both for the rich population of waterfowl which use the area for cover, as well as the likelihood of further natural succession to cottonwood woodlands. The THC plans to develop the base of the Spit and to convert the land to retail uses and business parks will clearly negatively impact the existing willow thicket habitats.

h) Manicured lands:

Human-made and maintained parks, lawns and gardens constitute manicured lands. These areas preclude natural succession by preventing natural understorey vegetation to regenerate the area. Manicured lands are deliberately cleared and planted, and are maintained as parkland for human enjoyment. Although manicured lands are not part of the natural ecosystem, they must be included under the Natural Succession criterion because of the terrestrial species which adapt to and colonize them. Human-tolerant species such as squirrels, raccoons and various nuisance species often invade and quickly adapt to the area. At present, manicured lands in the study area are limited mainly to the picnic grounds off Cherry Beach.

Impact value: RCFTW +1 THC +3

The THC clearly favours the creation of manicured parks and thus earns a positive impact value. Because the RCFTW favours a more natural approach to parklands, only a slight positive impact is predicted. It should be noted that manicured lands are not considered ecologically stable due to the reliance on human intervention and the need for control of nuisance species, and are therefore of questionable appropriateness to the fostering of terrestrial ecology in the Port Industrial lands.

5.4 Organism Health

The final criterion required to achieve the selected goals is organism health. Ideally, the measure of organism health should be taken from bioassays in which contaminant levels in organisms and their and causal links to sources are identified. Aside from being extremely costly and time consuming, the bioassay procedure is unreliable. As with human epidemiological studies, cause-effect links are difficult, if not impossible to establish due to the number and variety of potential contamination sources as well as the variability of uptake pathways. In addition, the second draft of the RCFTW Natural Heritage Technical Paper (Phase 2), October 1990 elaborates similar problems of measuring organism health in severely contaminated areas.

Visible garbage:

Following the difficulty of obtaining accurate readings of individual and community organism health and the lack of data collected at the present time, an alternate indicator must be

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

selected. Therefore, for the purposes of simplicity, this report uses the measure of visible garbage as an indicator of GENERAL organism health. Although it is recognized that this is a superficial parameter by which to measure health, the amount of visible garbage is nonetheless an observationally accurate means to estimate the probability of further contamination of the ecosystem.

Impact value: RCFTW +2 THC +1

Both proposals are considered to improve the general health of the biota in the study area. The RCFTW is likely to have a more positive effect, due to the emphasis on natural conditions combined with ambitious plans for clean-up of the adjoining Don Valley. The THC may not have an overly positive impact on organism health due to the attraction of more tourists to manicured parks and recreation facilities.

6.0 EVALUATION

From the Impact Analysis in section 5.0, the impact values assigned to each indicator are added to provide a total value for each of the 4 criteria used to measure achievement towards the selected 3 goals, CLEAN, GREEN and CONNECTED. The overall impact values for each proposal are obtained by adding the values for the 4 criteria. The final results are shown below in Table 6.1.

Table 6.1: Final Impact Values

1. Species Diversity:	RCFTW +9	THC -5
2. Pop/n Abundance:	RCFTW +11	THC -7
3. Natural Succession:	RCFTW +12	THC -2
4. Organism Health:	RCFTW +2	THC +1

Proposal Totals:	RCFTW +34	THC -9

From the above results, it is clear that the RCFTW proposal has many potentially positive impacts on the terrestrial ecology of the study area. From this observation it may be deduced that the RCFTW proposal is more conducive to an environment which encourages terrestrial biota. From the working definition of sustainable development provided in section 1.1, the minimization of adverse impacts on the environment indicates that development may be considered sustainable. In this regard, the RCFTW proposal is more favourable to the terrestrial ecology of the Port Industrial lands than the THC proposal.

It should be emphasized once again, that there are many notions of sustainable development, none of which satisfy all situations to which the phrase is applied. It remains the author's opinion that sustainable development is an ideal rather than an achievable goal. This ideal is largely an excuse for on-going, excessive economic growth cloaked in the green politics of the day. For this reason, it is prudent to recognize the simplicity of the definition of sustainable development used as a basis for the EA and the terrestrial ecology component thereof.

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

7.0 RECOMMENDATIONS

Fundamentally, both the THC and the RCFTW proposals call for similar plans to improve the waterfront area. Following the reasoning in section 6.0 (Evaluation) above, the RCFTW proposal is clearly favourable to the terrestrial ecology component of the EA. This reasoning however, is based purely on a conceptual plan which does not provide any budget details such as costs to taxpayers, a timeline for implementation, or a specific framework for implementation. Although highly ambitious, the RCFTW proposal is short on specific details, leading to the conclusion that the proposal is politically idealistic. In contrast, the THC proposal provides budget details, a timeline and framework for implementation. The THC plans for the waterfront area do not minimize impacts on the terrestrial ecology, yet in terms of realistic implementation, this proposal has definite merit.

Therefore, this report recommends that changes be made to the RCFTW proposal in order that it may be considered seriously for implementation. The primary requirement is obvious: an implementation strategy which includes a budget, estimating costs to taxpayers, and a timeline stipulating phases of development and rigorous details of each development phase. Without such parameters, the RCFTW proposal remains an undeveloped concept with little basis in reality.

8.0 REFERENCES

BIOTIC SUB-MODEL: TERRESTRIAL ECOLOGY COMPONENT

Royal Commission on the Future of the Toronto Waterfront 1990
Natural Heritage Technical Paper (Phase 1). May 1990

Royal Commission on the Future of the Toronto Waterfront 1990
Natural Heritage Technical Paper (Phase 2). second draft only, October 1990

Royal Commission on the Future of the Toronto Waterfront 1990
Watershed: Interim Report August 1990.

Toronto Harbour Commissioners 1990
Discussion Paper: Port Industrial Area Concept Plan.

Toronto Harbour Commissioners 1988
"Port of Toronto News", 35:3.

9.0 APPENDIX

Aquatic Ecology

Beth Jefferson

THE AQUATIC ECOSYSTEM OF THE PORT INDUSTRIAL LANDS

THE IMPACT OF THE TWO PROPOSALS ON THE AQUATIC ECOSYSTEM:

(A) TORONTO HARBOUR COMMISSION

(B) THE ROYAL COMMISSION ON THE FUTURE OF THE TORONTO
WATERFRONT

E.A. Jefferson

JPG 1413

Prof. J.B.R. Whitney

Nov. 23, 1990.

TABLE OF CONTENTS

A. INTRODUCTION	1
B. THE EFFECTS OF PROPOSED CHANGES TO THE AQUATIC ECOSYSTEM	3
1. Habitat Assessment	3
a) Parkland	3
b) Fish Habitat	4
c) Waterbird Habitat	4
d) Visibility/Clarity	4
e) Length of Water's Edge Accessible to the Public	5
2. Species Diversity	5
a) Diversity	5
b) Relative Abundance and Population Size	6
3. Connections Outside the Port Ecosystem	6
a) Biogeographical Theory	6
b) Impact of the Don River	7
c) Relationship to Lake Ontario	7
4. Indicators of the Health of an Ecosystem	8
a) Contaminants	8
i) Cleanness	8
ii) Eutrophication	9
iii) Circulation Patterns and Contaminant Traps	9
5. Human Use and Adverse Effects on the Aquatic Ecosystem	10
Potential Conflicts and Disturbances to Wildlife	10
i) Shipping	10
ii) Dredging	10
iii) Industry	10
iv) Recreational	11
v) Seasonal Conflicts	11
C. CRITERIA TO MEASURE THE EFFECTIVENESS OF THESE CHANGES	13
1. Species Diversity Indices	13
2. Habitat Assessment	13
3. Connections to the Don River, Harbour, Lake Ontario	14
4. Measures of the Health of an Ecosystem	14
5. User Surveys	14
D. SUMMARY	16
E. CONCLUSIONS	17
F. BIBLIOGRAPHY	18
G. APPENDIX 1: DIAGRAMMATIC MODEL OF THE AQUATIC ECOSYSTEM	20

A. Introduction

THE AQUATIC SUB-MODEL examines the food web of the Outer Harbour, ship channels and shallow shore lands, including temporary low lying ponds and marshy areas. Each species has its own preferred food and the connections in the web can be very complicated, so that basically only broad generalizations are depicted in the diagrammatic model presented here (See Appendix).

Benthos (invertebrates in the sediments) and phytoplankton are food for zooplankton, small fish, shorebirds, and dabbling waterfowl. Larger fish, terns, gulls and some diving ducks, eg. mergansers and loons, prey on smaller minnows. Other diving ducks, like scaup and oldsquaw feed on both invertebrates and plants found throughout the water and in the sediments.

The composition of the ecosystem varies with the season. Winter finds an influx of waterfowl, with large numbers of diving ducks from the Arctic and Prairies, as well as Herring Gulls making use of the open water habitat of the Lake, Harbour and Main Sewage Treatment Plant. In summer numbers of waterfowl are more limited to Canada geese, mallards and herons. In shallow water habitats there are found amphibians and larger invertebrates, preyed upon by herons, reptiles and raccoons. These shallow areas become important in migration as staging areas for shorebirds, which feed voraciously on insect larvae there.

The shallow waters along the north shore are spawning

habitat for shiners and smelt, which in turn are preyed upon by larger predators like Brown Trout, that migrate in from the open waters of Lake Ontario in late summer and fall. The most diverse fish community was identified in the waters off Cherry Beach and the north shore (Royal Commission, Unpublished Draft 1990)

B. The effects of proposed changes on the aquatic ecosystem

In considering the impacts of either the Toronto Harbour Commission and the Royal Commission proposals on the aquatic ecosystem, a number of features need to be examined -- the water habitat off from the piers and beach, the Inner Harbour and Outer Harbour around the north shore, the edges of the land as it meets the water, the type, if any, of vegetation overhanging the shore, and the use to which the land will be put, and subsequent discharges to the water. Parkland around Cherry Beach and south of Unwin Ave has been included in both proposals. Less polluting industries have also been recommended. Where the proposals differ is, the type and amount of each of these, which ultimately will have an impact on any aquatic life.

1) Habitat Assessment

The greater the variety of habitat present, the greater the diversity of species. Each individual species is adapted to specific requirements with respect to water depth, water temperature, type of food preferred and consequently where the species feeds, kind of shelter required, and thus places where it will be found --- and even each of these will vary seasonally.

a) Parkland

Type of parkland is an evaluation of habitat diversity. Parkland proposed by the THC will not be very beneficial in creating habitats for diverse species of aquatic wildlife. One has just to visit the manicured waterfront at Sunnyside, which was created by the THC to see the impact these mowed lawns have

on what have become nuisance species -- geese that graze on the grass and gulls that are fed handouts by picnickers.

Because more natural areas are to be left in the parkland the proposal of the Royal Commission is generally considered better for wildlife. Policies of non-intervention and re-creation of natural habitats like marshy areas should allow for an increase in the diversity of aquatic species.

b) Fish Habitat

Appropriate fish habitat requires a variety of bottom cover -- for feeding, spawning, and protection. The complexity of considerations that must be given to good fish habitat can be illustrated by the following remarks from fishermen: smallmouthed bass love stony shorelines and rocky bottoms in lakes. Immense schools of fish are found at the "edge", off Toronto Islands in the nutrient-rich waters, where bait-fish proliferate. Salmon rest in the cool deeper waters offshore moving in to feed, lying in wait in the rocky shallows.

c) Waterbird Habitat

High quality habitat for waterfowl and shorebirds depends on similar diverse factors, which provide the necessary shelter or food, for breeding and/or during migration.

d) Visibility/Clarity

The amount of sunlight that can penetrate the water has a direct impact on the growth of aquatic plants and thus the presence of zooplankton in the habitat. Because the kind of higher plants present are indicators of habitat suitability for

various fish species, clarity of the water directly affects the presence of fish and other vertebrates higher up the food chain.

Elevated levels of suspended sediments occur in Asbridge's Bay due to overloading discharges from the Main Sewage Treatment Plant during and after storm events. The clarity of the water in the Harbour is also poor during dredging operations in the Keating Channel.

e) Length of Water's edge Accessible to the Public

Fewer hard edges along the shore, compared to natural, green edges, besides being aesthetically pleasing are another factor of good fish habitat. Shallower, natural edges are preferred by fish and other animals for feeding, as they are good habitat for invertebrates.

Because the Port activity is central to the THC, more hard edges and limited numbers of habitat structures will be present than in the Royal Commission proposal, where active re-creation of natural fish habitat has been recommended.

2) Species Diversity

a) Diversity

The variety of species present is an indicator of the quality of any ecosystem. The more species, the better the quality. Desirable, high-quality gamefish are preferable to the more pollutant-tolerant and less valuable species of fish like carp and suckers. Because types of species are representative of the particular habitat, the abundance of one species can indicate much to a biologist. With respect to benthic invertebrates,

tubifex worms are characteristic of stagnant water with much organic enrichment. On the other hand, because they require more oxygen to survive, the presence of caddis fly larvae means a better quality habitat.

b) Relative Abundance and Population Size

Numbers of nuisance species (gulls and geese) should decrease in time with natural succession and improvements to habitat quality. The ratio of native to exotic species will decrease, according to biogeographical theory, with larger, more natural habitats.

There is greater potential for more species diversity and larger numbers of desirable species, given the recommendations for habitat in the Royal Commission Watershed report.

3) Connections outside the Port Ecosystem

a) Biogeographical Theory

Biogeography indicates that the presence and size of any corridors increases diversity and abundance of species. Fragmented habitat is the major cause of decreasing species diversity. Access to quality corridors for wildlife movement could improve the quality of the aquatic ecosystem in the Port. A more natural corridor will contribute to a greater variety of "desirable" species. Thus the extension of the Don Valley green corridor as proposed by the Royal Commission as a wildlife link, will be important in regeneration of the area. The Open Space Networks that have been suggested by the THC will also act positively as corridors for wildlife, yet these links are

expected to be manicured, so the positive impact will not be as significant.

b) Impact of Don River

The Don River has been identified by many as the major input of contaminants and sediments into the Toronto Harbour as a result of intense urban development upstream. Toxic chemicals bound to the sediments have an impact on water quality and aquatic life.

In order for the water of the Port to improve, there has to be a clean up of the sources of the pollutants along the entire Don River Watershed. No consideration is given to this in the THC proposal. The Declaration of Provincial Interest in the Port Area and consequent recommendations by the Royal Commission to take an ecosystem approach to Port water quality by beginning measures to clean up the Don, mean that here would exist greater possibilities for a positive impact on the life in the Harbour.

c) Relationships to Lake Ontario

Movements of larger sportfish, especially salmon from the central waterfront to the larger environment of Lake Ontario mean that they cannot be analyzed for site specific contaminants. Gulls, terns, herons and cormorants, all of which are tested annually by the Canadian Wildlife Service for organochlorine levels, also migrate beyond the Port ecosystem after breeding in the area.

Positive recommendations by the Royal Commission which are related to the Remedial Action Plan to clean up the water in the

Harbour would only benefit the life therein, as would the support that the RC has shown for other RAPs in Areas of Concern on Lake Ontario.

4) Indicators of the Health of an Ecosystem

a) Contaminants

Benthic fauna are widely used as indicators of total environmental conditions at specific locations in time. Besides using species composition representing a combination of many factors, eg. water depth, substrata type, organic matter, temperature, benthos can be easily analyzed for toxics. From this information the potential for the transfer of these contaminants up the food chain can be extrapolated.

The public, in evaluating the health of an aquatic ecosystem, is influenced by, among other things, the number of tumours on the fish that are caught. Fishermen indicate that this is aesthetically unpleasing and a factor in the decreased fishing along the Toronto shoreline. (Royal Commission March 1990).

The presence of contaminants in fish and fish-eating birds, and consequent deformities is greater with more discharges and emissions to the ecosystem. Without a clean watershed approach, these contaminants can not decrease. There is an opportunity for a reduction of contaminants with the approach being recommended by the RC, but not with the THC proposal, if at all, for many reasons.

i) Cleanness

Cleanness in terms of garbage floating on the water can be visually unpleasant, but is also a factor in the safety of both fish and birds. For example fishing lines, plastic rings for pop cans, etc. can easily strangle a duck or gull. Litter is greater with increased public use. More intensive public use would occur with both proposals, but especially with the THC proposal.

Cleanness in terms of garbage around industries would depend on the type of the industry and is discussed under industry emissions (to follow), dust and litter being the most visual "emissions" from a factory. More of these would be expected from the THC proposal than that of the RC, given the types of industries proposed.

ii) Eutrophication is characterized by excessive growth of macrophytes -- algae and other aquatic plants, related to increased levels of phosphorous and nitrogen in the water. As the Port area is already bordering on eutrophic, only clean-up changes recommended by the RC are expected to have a positive effect.

iii) Circulation Patterns and Contaminant Traps

Open circulation at Cherry Beach has basically been responsible for less bacteria there and allowed it to remain open for swimming more frequently than other Toronto beaches. Smooth edges, and not natural edges are less likely to trap contaminants. More of the former would be present in the Harbour Commission proposal, and consequently less bacteria.

Bacteria are not necessarily a negative factor for other

life within the aquatic ecosystem, and have even been beneficial in attracting shorebirds and waterfowl to the open water tanks at the Sewage Treatment Plant. Birders are consequently not as concerned about bacteria as they are about other contaminants in the food chain.

5) Human Use and Adverse Effects on Aquatic Wildlife

a) Potential Conflicts and Disturbances to Wildlife

i) Shipping

If large scale spills of oil or toxics occur, shipping could have a major deleterious effect on the aquatic ecosystem. Even the oil from recreational vessels has been identified as a factor in the contamination of the system. The THC proposal emphasises port use. There is more opportunity for aquatic ecosystem impairment in this proposal than in that recommended by the RC.

ii) Dredging

Dredging of the channels is necessary if shipping is to continue. Consequent resuspension of sediments causes elevated levels of metals and organic compounds initially, with the prospect of a cleaner substrate in the end, providing the source of these sediments and contaminants is removed or cleaned up.

iii) Industry

Depending on the type of industry, there are greater possibilities for emissions and discharges with the THC proposal. With emphasis on "green" industry, there is less chance of emissions into the ecosystem with the RC proposal. Yet even cooling water discharges can make the habitat unsuitable for

fish. Conversely warm water discharges have a positive impact on the productivity of plankton. In the past, the outlet from the Hearn Generating Plant has provided good fishing and excellent waterfowl viewing, as both species are attracted by the greater quantity of food present.

iv) Recreational

The recreational aims of the THC are intensive, active marinas, anchors for motor boats and yachts. This has consistently been opposed by Friends of the Spit as disruptive to waterfowl habitats. Other plans for the Cherry Beach area include canal/skating rink, boardwalk, maritime theme park, model boat pond, allotment gardens and parking.

On the other hand the Royal Commission recreational aims are more passive. It has recommended that sailing-club facilities, interpretive centres and parking lots should be distributed along the north shore, rather than all being placed together (Aug. 1989). Natural regenerated areas south of Unwin Ave. would be centred around wildlife -- fishing, birding, etc. Yacht clubs now located on the Leslie St. Spit would be relocated to the north shore to protect the urban wilderness of the Spit. The Outer Harbour, here protected, would also be the location of board sailing and canoe clubs. Although the focus is not entirely on wildlife, the less intensive recreational activity would be less disruptive to the aquatic ecosystem.

v) Seasonal Conflicts

Traffic creating disruptions is seasonal and would not

affect wintering species. There is not much of interest for the birder until fall migration begins, and winter on the lake can bring spectacular showings of unusual species like the Gyrfalcon that has been hanging around feeding on ducks from Nov. 4 to Nov. 19, 1990. The season at which most naturalists use the area, is not summer so there would be minimal conflict with boaters, picnickers, etc. Fishing too, has its seasons. In fall and winter large predator species come closer to the shallower, warm shore waters to feed.

C. Criteria to Measure the Effectiveness of these Changes

1) Species Diversity Indices

Relative abundance and population size at different times of the year can be easily determined. Numbers of nuisance species should decrease in time with improvements to habitat quality. The ratio of native to exotic species will decrease, according to biogeographical theory, with larger, more natural habitat.

Past and present lists of birds and fish are very complete so that comparisons in the future can be made to see if there is an increase in diversity. Measurements that can be used are:

Waterbirds: Christmas Bird Census
Mid-winter Waterfowl Inventory
Breeding Bird Census

Fish: Margolet Diversity Index Score
Index of Biotic Integrity
Counts of fish caught per unit effort: CPUE
Seasonal Variations, eg. numbers of predator
fish in the fall.
Beach Seine Collections
Electrofishing Collections
Creel Census

2) Habitat Assessment

Scuba divers can examine the following and compare to results obtained in the summer of 1990:

Percent of bottom sediment cover
Percent composition of sediment components
Depth of water: to indicate type of fish, invertebrates that
could be expected.
Visibility
Macrophytes: Counts of larger plants and amounts of algae.
Temperature of the water at various locations: each species
has specific requirements.
Length of Water's Edge Accessible to the Public
Percent of Hard Edges Compared to Natural, Green Edges.

3) Connections to Don River, Harbour, Lake Ontario

Access to and the quality of these corridors improve the quality of wildlife in the Port. Fragmented habitat is the major cause in decreasing species diversity. Biogeography theory indicates that the size of the habitat and the corridors increases diversity. Examination of the connections will allow comparisons with the Port ecosystem.

4) Measures of Health of the Ecosystem

Cleanness in terms of garbage floating on the water can visually be determined. As well,

Mapping of water circulation patterns would determine contaminant traps.

Visual inspection of fish for tumours.

Biomonitoring of metals and organochlorides in index species:

Caged Clams

Young of the Year (YOY) Spottail Shiner

Sport Fish

Fish-eating birds (gulls, cormorants)

Bacterial counts at Cherry Beach and the number of days in the summer that it has to be closed for swimming.

Bioaccumulation Factor

Amounts of the above should decrease as the ecosystem is improved. Movement up the food chain can be extrapolated from this data.

5) User Surveys

Questionnaires should be presented to fishermen, birders, botanists, entomologists, small boaters to determine their values perception of the area, amount of use, distance travelled to get there, and time spent in the area. Numbers of users and the variety of users will increase with better quality habitat that

D. Summary

EFFECTS OF PROPOSED CHANGES ON THE AQUATIC ECOSYSTEM

Goals: Clean & Green, as defined by the Royal Commission on the Future of the Toronto Waterfront

SCALE:

NEGATIVE IMPACT
(Away from the goals)

POSITIVE IMPACT
(Towards the goals)

-3.....-1
Greatest.....Least

0
No Change

+1.....+3
Least.....Greatest

CRITERIA	THC	RC
Greater Species Diversity	-2	+3
Types of Species (More Desirable)	Gulls/Geese 0	+3
Greater Abundance of Life	0	+3
Corridors for Wildlife:	Manicured	Natural
Don River Clean Up & Regeneration of area	No plans 0	Watershed approach +3
Fewer Contaminants in:		
Sediments	0	+3
Clams	0	+3
YOY shiners	0	+3
Sport fish	0	+1
Fish-eating birds	0	+1
Less Visible "Garbage":		
-in parks	-2	-1
-around industry	+1	+3
-algae	0	+2
Less Bacteria at C.Beach (More Swimming)	0	0
Greater Habitat Diversity	+1	+3
Parkland:Type	Manicured	Natural
Amount	None at Base of Spit	More
Edges	Hard	Natural
Suitable Fish Habitat	0	+3
Suitable Thermal Variations for		
Fish	0	+2
Less Suspended Sediments	0	+2
<u>Human Uses & Adverse Effects on Aquatic Wildlife:</u>		
More traffic creating disturbance:		
Summer	-3	-1
Winter	0	0
More Disruptions from:		
Shipping	0	0
Dredging	0	?0
Industry:		
Type	Less Green	Green
Decreased Emissions	+1	+3
Recreationalists	-3	-1
	Active (Marinas)	Passive

E. Conclusions

Conservation and preservation of habitat as has been recommended by the Royal Commission would have more beneficial effects on the aquatic ecosystem. The costs of cleaning up the Don River would be enormous, but such tasks have been accomplished in Europe over a number of decades, with support from many agencies, financed by the changing trends in employment (Richardson 1989).

The Toronto Harbour Commission proposes that through the creation of more intensive industry and shipping, finances would be available to enable the implementation of their plan. The Royal Commission has yet to address this problem. However, the monetary costs of the RC parklands proposal will in some sense be less, as there will not be the need for extensive park management and associated expenditures that there would be with the THC proposal. Vegetation could be left to regenerate on its own after a few simple things are done, like bulldozing to create low lying ponds or placing tree crowns along the shore for fish.

In spite of the present poor aesthetics of the area and periods of poor angling success, the area is extensively used by anglers and birders.

Benefits in terms of better mental health in a dense urban environment, through the creation of peaceful green space, and easy access to lake vistas cannot be so easily measured.

Royal Commission on the Future of the Toronto Waterfront, Water Work Group,

May 1990b. Environmental Audit of the East Bayfront/Port Industrial Area Phase I, Technical Paper No. 5. Aquatic Environment. Toronto: Royal Commission on the Future of the Toronto Waterfront.

Royal Commission on the Future of the Toronto Waterfront,
August 1990. Watershed, Interim Report Summer 1990. Toronto: Royal Commission on the Future of the Toronto Waterfront.

Royal Commission on the Future of the Toronto Waterfront, Natural Heritage Work Group,

Unpublished, October 1990. Environmental Audit of the East Bayfront/Port Industrial Area Phase II, Second Draft of the Natural Heritage Technical Paper. Toronto: Royal Commission on the Future of the Toronto Waterfront.

Toronto Harbour Commission,

March 1988. Discussion Paper: Port Industrial Area Concept Plan, Toronto: Toronto Harbour Commission.

Canadian Wildlife Service

Paul Mitchell-Banks

Canadian Wildlife Service
Environmental Assessment of the
Port Industrial Area

A Comparison of the THC and RCFTW Proposals

University of Toronto

JPG 1413F

Professor Joe Whitney

November 27, 1990.

Paul Mitchell-Banks

Student # 009085989

TABLE OF CONTENTS

<u>1.0 Environmental Assessment and Sustainable Development</u>	<u>1</u>
<u>2.0 Background to Development Proposals</u>	<u>3</u>
<u>3.0 Methodological Approach</u>	<u>5</u>
<u>3.1 RCFTW Proposal Goals</u>	<u>5</u>
<u>3.2 THC Proposal Goals</u>	<u>6</u>
<u>4.0 Impacts of the Two Proposals</u>	<u>7</u>
<u>4.1 Clean</u>	<u>7</u>
<u>4.2 Green</u>	<u>8</u>
<u>4.3 Useable</u>	<u>8</u>
<u>4.4 Diverse</u>	<u>9</u>
<u>4.5 Open</u>	<u>9</u>
<u>4.6 Accessible</u>	<u>10</u>
<u>4.7 Connected</u>	<u>10</u>
<u>5.0 Evaluation of the Impacts of the Two Proposals</u>	<u>11</u>
<u>6.0 Recommendations</u>	<u>12</u>
<u>7.0 References</u>	<u>14</u>
<u>Figures 1-16.</u>	<u>15</u>

1.0 ENVIRONMENTAL ASSESSMENT AND SUSTAINABLE DEVELOPMENT

This Environmental Assessment deals with two land development proposals concerning the area known as the **Toronto East Bayfront and Port Industrial Lands**. The first proposal is from the **Toronto Harbour Commission (THC)**, the present authoritative body for the area, while the second is from the **Royal Commission on the Future of the Toronto Waterfront (RCFTW)**. This assessment considers the impact of the two proposals on the three major interests that the **Canadian Wildlife Service (CWS)** has in the area in question, namely: **wildlife species control; habitat management and biomonitoring; and wildlife interpretation.**

The amount of development will have a direct impact on the potential for certain species to inhabit the area on a year round or seasonal basis, or use it as a migratory staging area. An example of this relationship can be found with the Canada Goose, whose numbers in some urban park lands (Stanley Park in Vancouver, for example) have reached the point where population control is required. Control might consist of coddling the eggs, sonic cannons, removal of birds from the area and transplanting to a more desirable site. Wetlands, meadows and grassy areas are all desirable habitats for this species, so consideration of open space allocation should anticipate potential population implications. A more natural setting permits natural predation and competition to act as controllers of the extent of the population.

Habitat management and biomonitoring is a very labour intensive, and at times capital intensive activity carried out by

the CWS, whose purposes are to monitor the various habitats that exist in the port area, and where required, conduct habitat reparation and maintenance. Wetland management is particularly demanding, and can require such activities as draining, scarification, dredging and watercourse redirection. The CWS has in the past formed cooperative associations with wildlife federations, naturalist clubs, and international organizations such as Ducks Unlimited. The nature of any possible agreements will depend on the industrial development, port development and allocation of parklands, and whether these parklands emphasize a natural or manicured landscape.

Wildlife Interpretation is one of the most visible activities of the Canadian Wildlife Service, and involves the establishment of wildlife interpretation centres and associated trails, blinds, displays and public access facilities such as access roads, and handicapped access and facilities. The Port area would make an ideal site for a Wildlife Interpretation Centre, having a large potential population base of visitors, easy access through roads and the TTC, and the close proximity of various factors, natural and artificial, which play important roles or impact on the local ecology. The close proximity of industry and the port facilities provide an excellent opportunity to explain the impact of these human activities on the local habitats, other factors include the city itself, Gardiner Expressway, Don River and Lake Ontario. Cooperative funding or administration agreements could be established with local governments, businesses and non-governmental

organizations such as the Ontario Federation of Naturalists.

The concept of Sustainable development first became widely known with the publishing of Our Common Future in 1987. That work defined it as "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs". This definition was intricately linked to social justice, in which the poorer people of the earth would have their essential needs given overriding priority, which by necessity meant accelerated development. (Our Common Future, 1987) This concept disenfranchised a large number of people, and a series of varied definitions have been advanced since that date. The definition that will be used in this EA is **"the minimization of adverse impacts on the environment"**. This is not an ideal definition, but it is a workable one, utilizing the concept of sustainability as a process, rather than a goal, in which planning takes into account the impacts of development and human interaction with the ecosystems.

2.0 BACKGROUND TO DEVELOPMENT PROPOSALS.

The administration of Toronto's harbour has passed through three distinct periods: 1793-1850 under the Provincial Government; 1850-1911 under divided ownership and control of a harbour commission, city authorities, railway companies and private individuals; and 1911 to the present under the THC. (Port and Harbour of Toronto January 1990 Pamphlet) The THC was incorporated under a federal act of parliament in 1911, with its creation

resulting from a growing dissatisfaction with the ineffectiveness of the Harbour Trust to deal with the problems caused by Ashbridges's Bay and the Don River (siltation and pollution respectively), as well as inadequate railway crossings, that were hindering the viability of the deteriorating port facilities. ("Memorabilia", 1988.)

The RCFTW was established in March 1988 as a result of growing concern regarding the current usage and state of the Toronto Waterfront. Its mandate is to make recommendations regarding the future of the waterfront, and to ensure that adequate input is received from all of the interested parties and stakeholders.

The RCFTW proposal involves a watershed approach, with the area in question running from Burlington to Port Hope, and being bounded to the Northwest by the Niagara Escarpment, and to the Northeast by the Oak Ridges Moraine. (Figure 1.0) The Watershed approach is used as it recognizes that anything that happens within this region is tied to the health of the waterfront (Watershed, 1990) We will focus on the immediate area involving the Toronto East Bayfront and Port Industrial Area, as this area is similar to that addressed by the THC. (See Figure 2.0) This is the only manner by which the two proposals can be compared, as the RCFTW proposal is far more encompassing than that of the THC. The THC have limited their plan to the area that they have mandated control over, while the RCFTW have dealt with an area that is multi-faceted in terms of legislation and government.

3.0 METHODOLOGICAL APPROACH.

The CWS falls into the biotic sub-model in the general classification of the three sub-models of the paper, as it is primarily focused on the terrestrial and aquatic ecosystems. The three interests also involve abiotic and human activity sub-models however, so the CWS can be viewed as an umbrella organization not only to the biotic sub-model, but in fact the other two as well. (See Figure 3.0)

3.1 RCFTW Proposal Goals.

This proposal involves nine goals: clean; green; useable; diverse; open; accessible; connected; affordable and attractive. Utilizing these goals, the proposal makes 80 recommendations for the Watershed, with seventeen of these being discussed in the section on the study area. (Watershed, 1990) Proposed major changes include: a consolidation and focusing of the THC's authority to running the port facilities; transfers of land not currently utilized or anticipated to be needed in the near future for port facilities to the City of Toronto (CITY) and the Toronto Economic Development Corporation (TEDCO) for parks and industrial areas respectively; the creation of a Don Valley Wildlife Corridor; the expansion of parks and the creation of the Toronto Waterfront Regeneration Land Trust (Land Trust) to remediate and regenerate contaminated lands. (See Figure 4.0)

The creation of parks, wildlife corridors and industrial areas are the recommendations that most obviously affect the CWS interests, as we are interested in ecosystem management, monitoring

and interpretation. The balance of an ecosystem can be very sensitive with respect to the biotic, abiotic and human activity stresses that can impinge on it. Too often the impact of human activity is ignored as is demonstrated by Figure 5.0

3.2 THC Proposal Goals.

The THC proposal is centred around three goals: provide for current and future needs of Port users; strengthen public access to and enjoyment of the Port Area; foster economic development within the study area. (THC Discussion Paper, 1988) Supporting these three goals are 11 recommendations or strategies, which are summarized as follows: designing and allocating adequate land and infrastructure to meet current and projected Port needs; improving access to and the extent of recreational areas and opportunities in the area; and maximizing the economic potential of the area by introducing appropriate industrial and business parks and implementing a sound development plan over time. (See Figure 6.0) As was the case with the RCFTW Proposal, the creation of parks, wildlife corridors and industrial areas are the recommendations of most interest to the CWS. This plan is also more specific with respect to proposed industrial development, the greater the extent of which will directly reduce the amount of green space.

The overlap of the goals of the two proposals led to the following list of goals that was consolidated for this study: clean; green; useable; diverse; open; connected; foster environmental awareness; affordable; attractive; enhance port use; economic development; attract tourists and status quo ownership.

The CWS is primarily concerned with the following seven goals: clean; green; useable; diverse; open; accessible and connected.

The criteria chosen to indicate how the two proposals will impact on the CWS goals will be discussed along with the anticipated impacts in the next section.

4.0 IMPACTS OF THE TWO PROPOSALS.

4.1 Clean. RCFTW+3 THC+1

The use of indicator species is a proven method of biomonitoring the habitats with respect to the goal of clean. Species such as caged clams, cat tails, caddice flies, and benthic organisms could be used to biomonitor the aquatic ecosystem. Herring gulls, flowering plants, deciduous softwoods such as Cottonwoods, could be used to monitor the terrestrial ecosystem. The watershed approach is critical in evaluating the cleanliness of the area, as the Don River is the largest source of water-borne contaminants in the area, and these can either remain in the aquatic ecosystem or be assimilated into the terrestrial one. The food chains or webs are often intricate in their array, involving a variety of species. (See Figures 7.0 and 8.0) Indicators are chosen for their behaviour, diet and morphology which facilitate their capture and analysis. The higher up the food chain, the more bioconcentration and biomagnification can occur. (See Figure 9.0) The RCFTW proposal addresses the clean up of the watershed and discusses the remediation of contaminated soils (Watershed, 1990) while the THC only address the question of contaminated soils (Mark

Conway, Oct 23, 1990). This failure to deal with all of the abiotic sources of contamination could have a significant impact on the species of wildlife found in the study area, as each organism has a range of tolerance for abiotic factors. (See Figure 10.0)

4.2 Green

Monitor the **quantity and quality of green spaces** as a percentage of overall land area, with special consideration given to edge communities, **especially riparian zones and wetlands**. Life is always concentrated at the edges of ecosystems or habitats, and the study area is a series of edges. (See Figure 11.0) RCFTW proposal offers more green areas of which most will be left in a natural state, with a non-interventionist approach. (See Figures 12.0, 13.0 and 14.0) (Second Draft, 1990). RCFTW+3 THC+1

Evaluate the **proportion of natural to manicured spaces** in light of anticipated use and wildlife utilization. THC offer less green space, with an emphasis on that being manicured. (THC Discussion Paper, 1988). RCFTW+3 THC+1

Monitor the **general health** of the ecological communities, with emphasis on **restoring indigenous populations and maintaining genetic diversity**. RCFTW emphasize natural areas, and indigenous species as inhabitants, either those present or who were residents in the past. (Second Draft, 1990). Also, RCFTW recognize importance of variety of habitats, which are important to diversity.

RCFTW+3 THC+1

4.3 Useable

Plan for the waterfront to appeal to **multiple users**, always

paying particular attention to impact on wildlife enthusiasts, an example of which would be a minimum distance from the beach for motorboat users. Particular emphasis is placed on this in the RCFTW proposal. RCFTW+3 THC+1

Consideration should be made to **accommodate the needs of families, children, the handicapped and the aged.** Once again the RCFTW proposal emphasizes this, and in representing the Federal and Provincial Governments would be more familiar with policies on open access/use to all. RCFTW+3 THC+1

Monitor the use of the areas through surveys and make adjustments to trails, facilities as required. The larger source of funds and greater focus of the RCFTW on public use makes their proposal more adaptable to change. THC more focused on economic considerations. RCFTW+3 THC+1

4.4 Diverse RCFTW+3 THC+1

A mixture of uses should be considered, with mixtures of public and private use, possibly establishing some research areas, high and low activity areas, artificial and natural settings, with an **emphasis on the natural environment.** This is explicitly considered in Watershed, and not mentioned in the THC proposal, other than referring to port areas, economic areas and recreational areas.

4.5 Open. RCFTW+3 THC+1

Construct a **trail system** that follows the lakeshore as closely as possible, thus **maximizing public access to the waterfront**, form this main trail system, secondary trail systems would branch off,

leading to wildlife viewing areas, landscape viewing areas, picnic spots, beaches, interpretation facilities. Although the THC plan does involve some trails, there is more industrial development, less green space, and a lower emphasis on public access to the waterfront. (Watershed, 1990; THC Discussion Paper, 1988).

4.6 Accessible.

Increase the amount of public transit to the area, and provide adequate parking facilities. Only RCFTW seriously look at this consideration. RCFTW+3 THC0

Walking and biking should network across the area, taking into consideration the particularly sensitive wildlife habitats. The RCFTW considers this more seriously than the THC who emphasize less green space, more manicured space, and really do not address the question of sensitive ecosystems. (Phase 1, 1990). RCFTW has a greater consideration for sustainable development in the terms used in this work. RCFTW+3 THC+1

Access should be available to all people, regardless of age and handicap. As was mentioned in useable section, RCFTW much more sensitive to this. RCFTW+3 THC+1

4.7 Connected.

RCFTW+3 THC+1

Continuous trails and green spaces link the entire waterfront, and ensure that the whole area is available to both human activity as well as wildlife. RCFTW offer more green space, more trails, a wider Don Valley Corridor, and greater access to the waterfront. The amount of green space and wildlife corridors would have a significant impact on the migrating birds, with two of the three

North American Flyways overpassing Toronto. (See Figures 15.0 and 16.0) The Don Valley acts as a major transportation corridor, and the RCFTW proposal is more generous and consistent with the consideration of connected green spaces. During migration for example, the four large bank towers downtown claim 200 bird collision fatalities a night. (Phase 2, 1990) These factors and the watershed approach clearly favour the RCFTW proposal.

5.0 EVALUATION OF THE IMPACTS OF THE TWO PROPOSALS.

It is extremely difficult to compare the two proposals accurately, as the scope of each of them is so different from the other. Still, assuming that with the RCFTW proposal, we are going to focus on the Port Industrial Area, we can add up the weightings given with respect to the criteria for the seven goals.

Table 5.1 Cumulative Impact Values

Goal	RCFTW	THC.
Clean	+3	+1
Green	+9	+3
Useable	+9	+3
Diverse	+3	+1
Open	+3	+1
Accessible	+9	+2
Connected	<u>+3</u>	<u>+1</u>
Total	+39	+12

The cumulative impact of the two proposals is provided in Table 5.1. It is clear that the RCFTW proposal is superior to that of the THC as far as the CWS and its interests are concerned, and is more sustainable in nature. We must acknowledge however that the definition of sustainability used within this exercise is

controversial and likely to be challenged.

6.0 RECOMMENDATIONS.

The two proposals for the waterfront area are essentially the same, when the greater scope of that of the RCFTW is factored out. The examination of the indicator criteria completed in section 5.0 clearly indicates that the RCFTW proposal is more favourable to the CWS. This consideration is exclusively focused on the proposals as concepts, and does not consider whether they are implementable after reviewing the following: budgetary details such as sources and uses of funds; feasibility, the existence of the technology or knowledge to achieve the stated aims; critical path analysis and implementation schedules; legal and social constraints. The RCFTW proposal is extremely ambitious, and raises a lot of concerns, but at the same time, it does not provide much in specific details in how to go about achieving the 80 recommendations. This suggests that the proposal is highly idealistic, and perhaps merely the beginning of what could involve years of analysis and planning.

In contrast, the THC proposal provides an implementation schedule, time line, and budget - in that the THC is self-funded, and is thus limited to undertaking work that it can finance through its revenue generating activities, or by taking on debt. This proposal is not as sustainable as the one of the RCFTW, but it has more a more realistic implementability. Furthermore, the THC have a proven track record for managing the Port area, whereas the Royal

Commission has no such claim.

What is needed is for the RCFTW proposal to now be analyzed and reformulated in terms of implementation, with serious consideration given to: the state of the economy; the will of the people; the limits of technology and knowledge; the likelihood of achieving cooperation from the greater number of players in the watershed than from the immediate waterfront area; the timeline and rigorous detailing of each stage. Without this detail, the RCFTW proposal will remain as a concept, and can not be considered as a proposal that could be implemented.

If the RCFTW proposal were chosen, assuming that an implementation schedule and plan were drawn up, a few modifications or important considerations should be noted. Factors such as existent diverse wildlife areas, such as the areas found at the foot of the Leslie Street Spit, and south Unwin Avenue and north of Cherry Beach should be singled out. (Phase 2, 1990). The hibernaculum at the base of the spit is a unique wildlife phenomenon and should be protected as such, perhaps in coordination with a Wildlife Interpretation Centre to be located in that area. Fish habitat could be enhanced through the addition of tree crowns to the north shore of the outer harbour in order to increase the amount of cover used by the fish in breeding and resting. (Phase 2, 1990) A concerted effort should be made to encourage the participation and assistance of non-governmental organizations in the planning, development and maintenance of the wildlife areas.

7.0 REFERENCES.

Chiras, Daniel D.(1988), Environmental Science, A Framework for Decision Making, Second Edition, Benjamin/Cummings Publishing Company, Don Mills.

Conway, Mark, THC Senior Planner, Personal Communication on October 23, 1990., Toronto, Ontario.

Royal Commission on the Future of the Toronto Waterfront (1989), Interim Report, Summer 1989, Ministry of Supply and Services, Ottawa.

Royal Commission on the Future of the Toronto Waterfront, (1990), Environment in Transition, Ministry of Supply and Services, Ottawa.

Royal Commission on the Future of the Toronto Waterfront, (1990), Environmental Audit of the East Bayfront/Port Industrial Area, Phase 1, Ministry of Supply and Services, Ottawa.

Royal Commission on the Future of the Toronto Waterfront, (1990), Environmental Audit of the East Bayfront/Port Industrial Area, Phase 2, Ministry of Supply and Services, Ottawa.

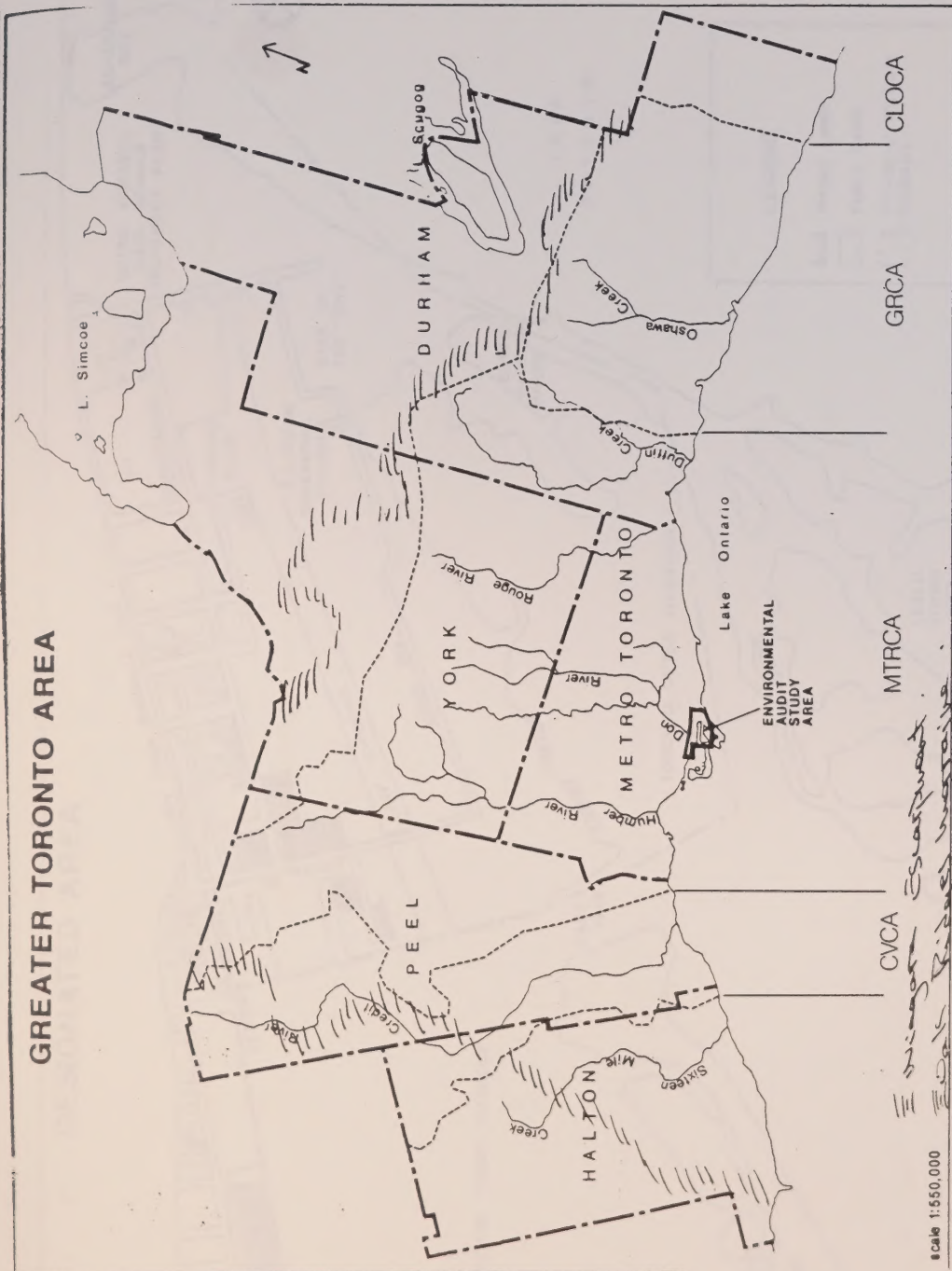
Royal Commission of the Future of the Toronto Waterfront, (1990), Watershed, Ministry of Supply and Services, Ottawa.

Toronto Harbour Commission (1988), Discussion Paper, Port Industrial Area Concept Plan, Toronto Harbour Commission, Toronto.

Toronto Harbour Commission (1988), "Memorabilia", Port of Toronto News, 1988, Toronto Harbour Commission, Toronto.

The World Commission on Environment and Development (1987), Our Common Future, Oxford University Press, Oxford.

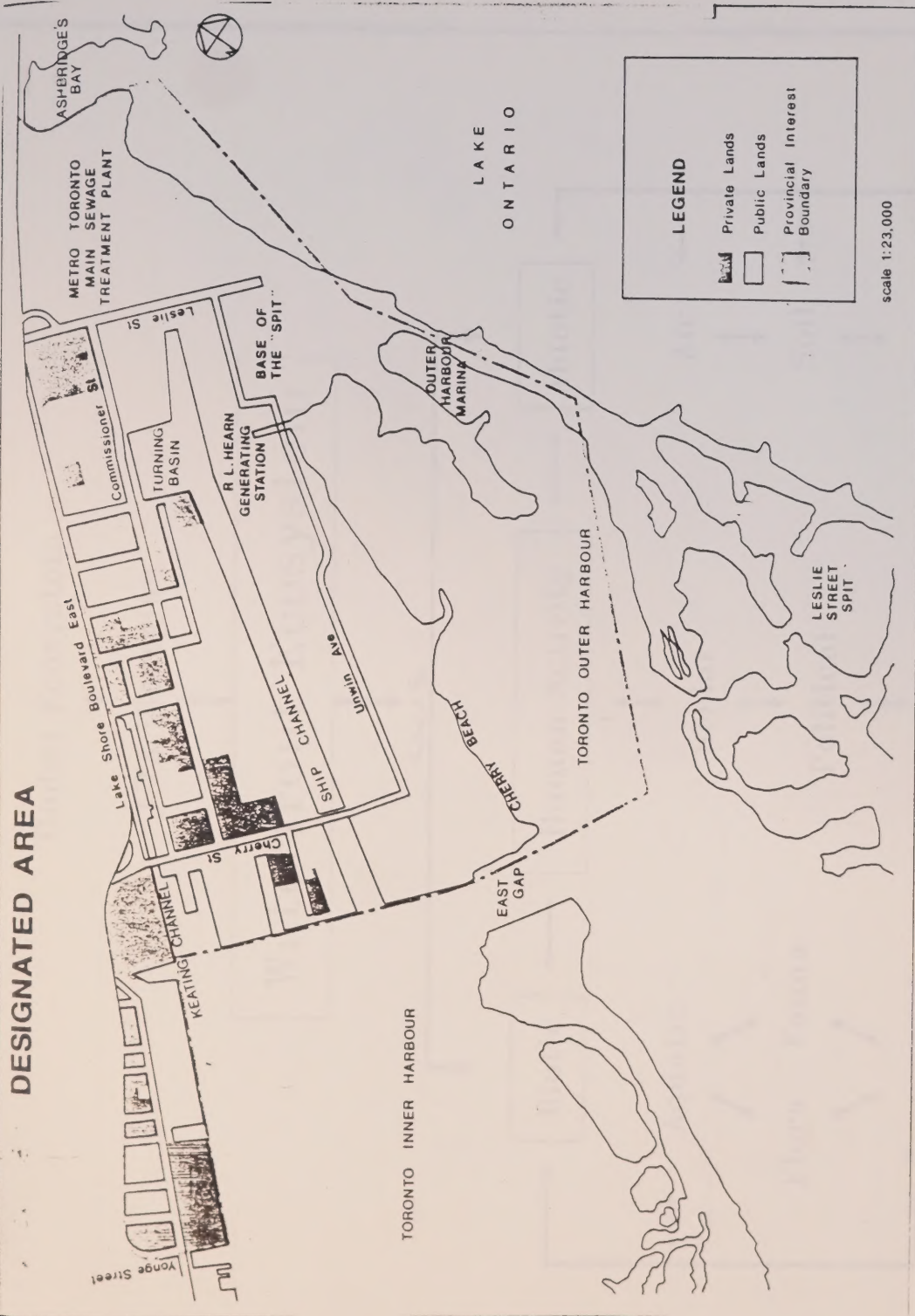
Figure 1.0



Conservation authorities: Halton Region (HRCA), Credit Valley (CVCA), Metropolitan Toronto & Region (MTRCA), Central Lake Ontario (CLOCA), and Ganaraska Region (GRCA).

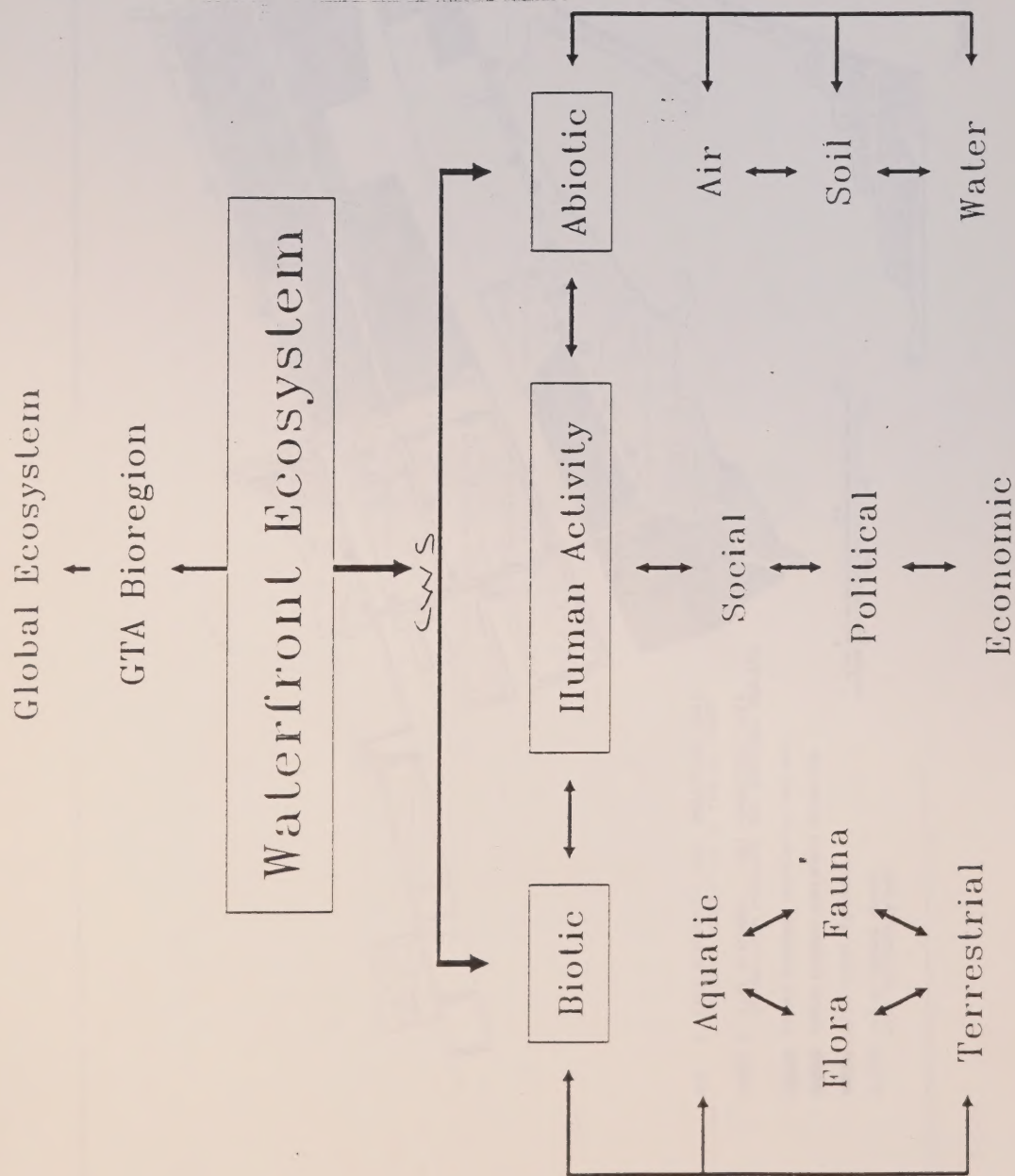
Source: Environment in Transition

Figure 2.0



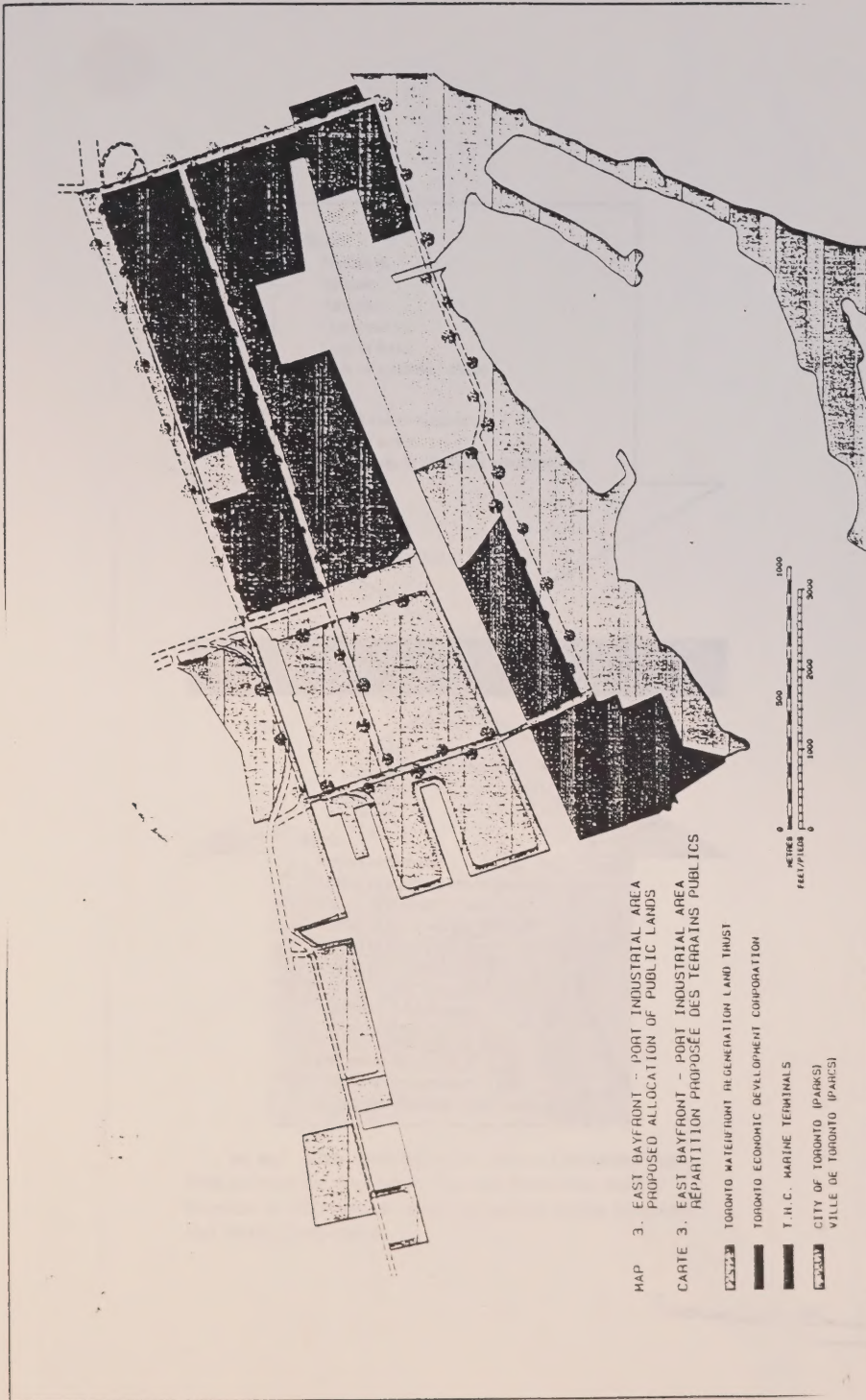
Source: Environment in Transition

Figure 3.0



Source: WTS class

Figure 4.0



Source: *Waterfront Regeneration Trust*

Figure 5.0

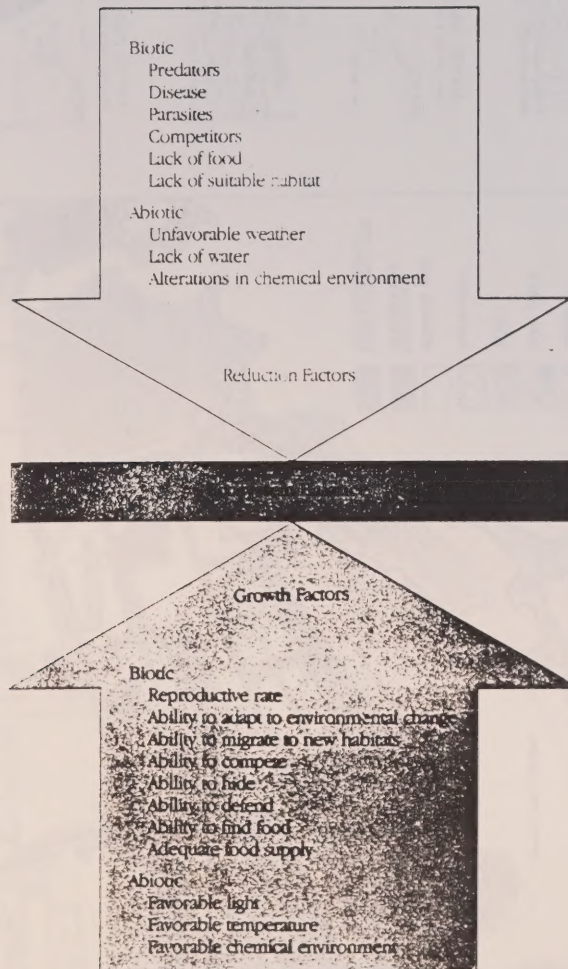
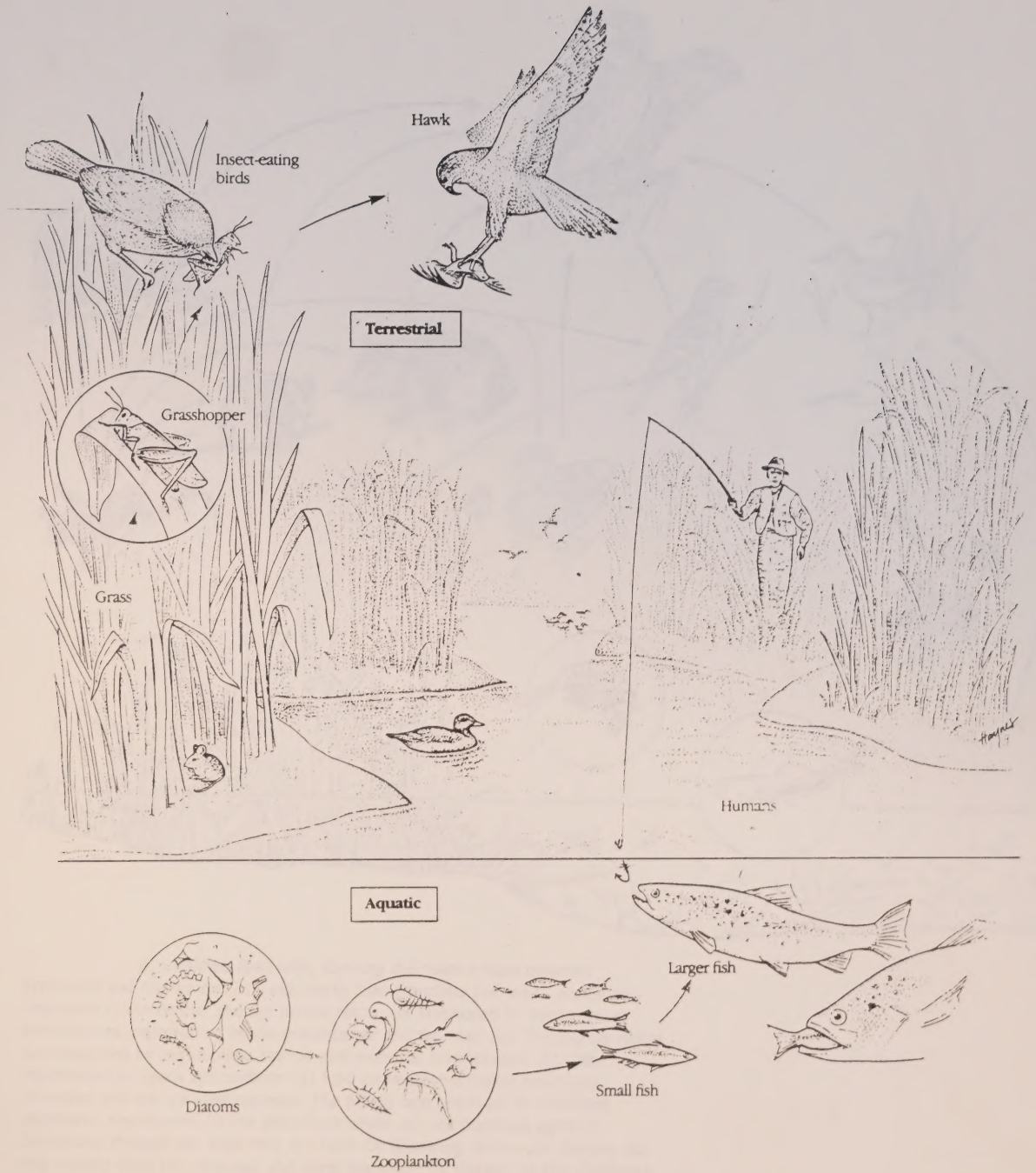


Fig. 5.2 Ecosystem balance is affected by forces that tend to increase population size and forces that tend to decrease it. Growth and reduction factors consist of abiotic and biotic components.

Source: Environmental Science

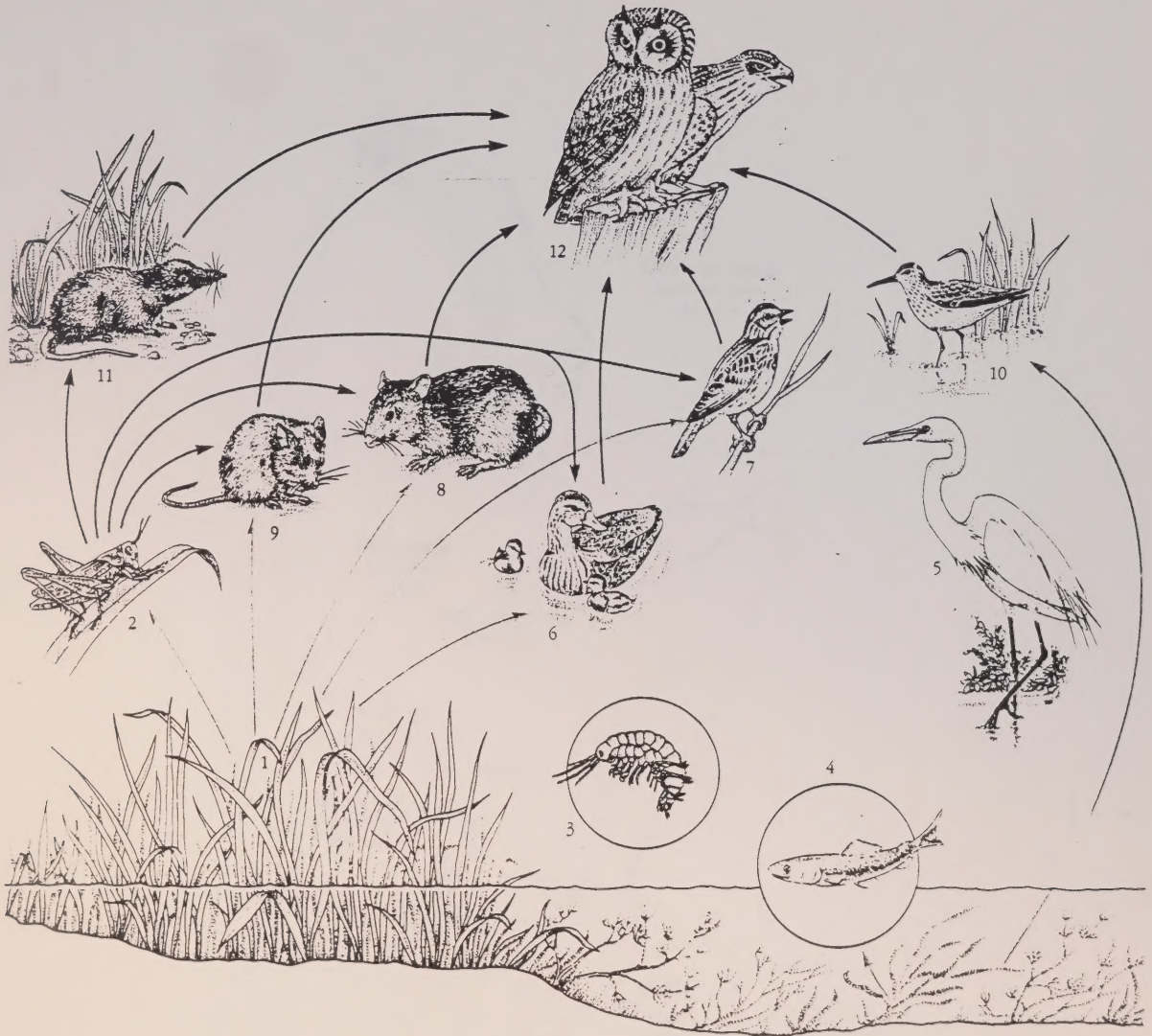
Figure 7.0



Examples of grazer food chains occurring on land and in water.

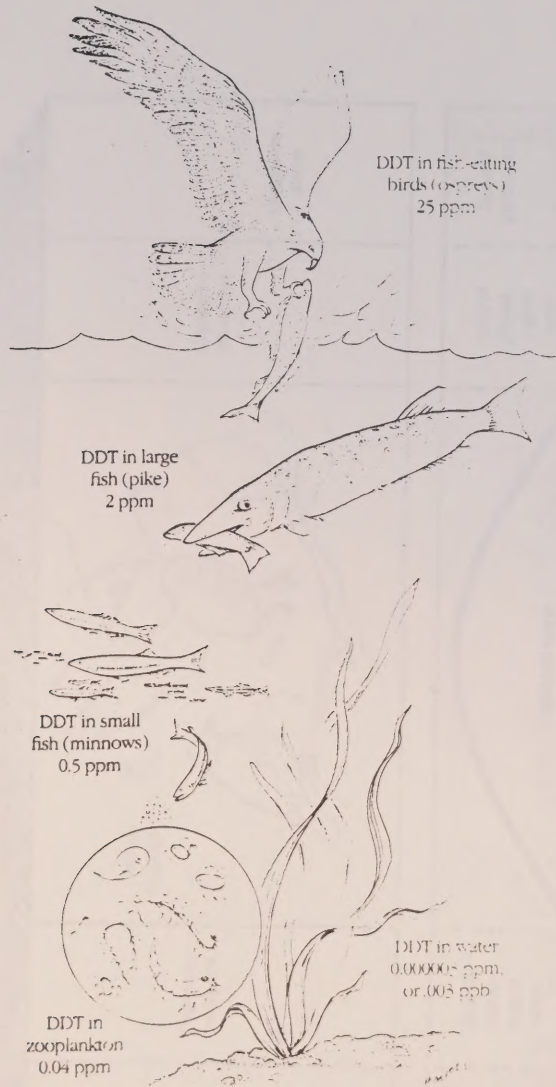
Source: Environmental Science

Figure 8.0



A simplified food web, showing the relationships between producers and consumers. In a salt marsh (San Francisco Bay area), producer organisms (1) terrestrial and salt marsh plants, are consumed by herbivorous invertebrates, represented by the grasshopper and the snail (2). The marine plants are consumed by herbivorous marine and intertidal invertebrates (3). Fish, represented by smelt and anchovy (4) feed on vegetative matter from both terrestrial and marine environments. The fish in turn are eaten by first-level carnivores, represented by the great blue heron and the common egret (5). Continuing through the food web, we have the following omnivores: clapper rail and mallard duck (6); savannah and song sparrows (7); Norway rat (8); California vole and salt marsh harvest mouse (9); and eastern and western sandpipers (10). The vagrant shrew (11) is a first-level carnivore, while the top carnivores (second level) are the marsh hawk and the short-eared owl (12).

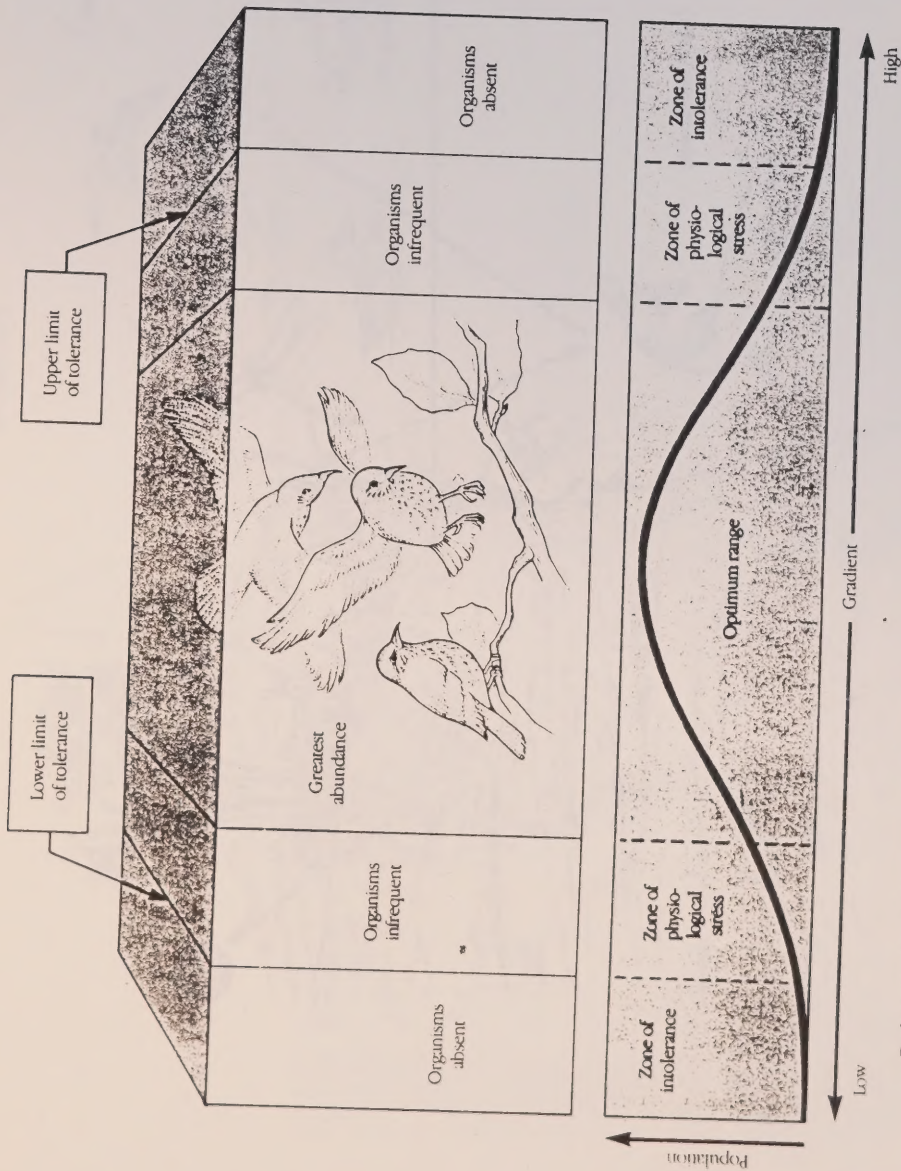
Figure 9.0



The biological magnification of DDT increases at higher levels in a food chain

Source: Environmental Science

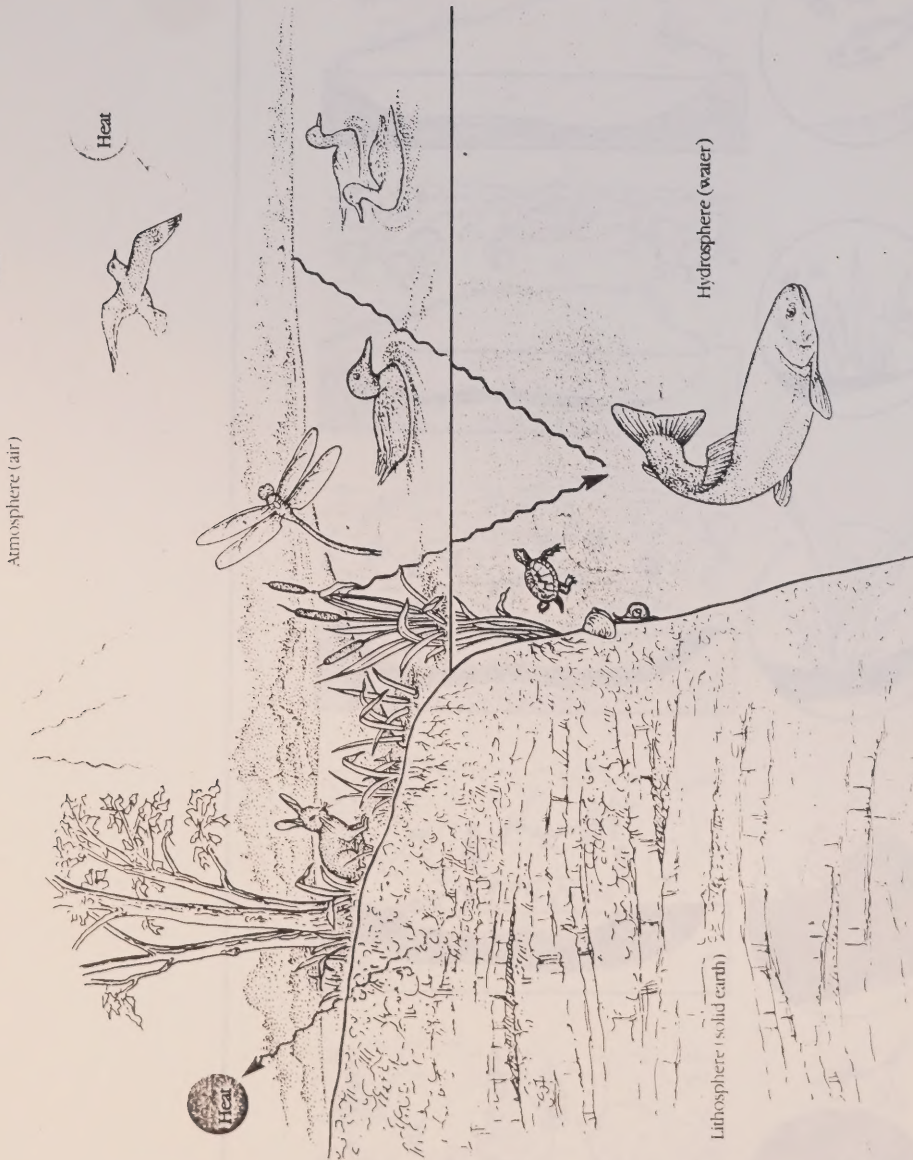
Figure 10.0



Each organism has a range of tolerance for abiotic factors. It survives within this range and can be killed by shifts below or above the range.

Source: Environmental Science

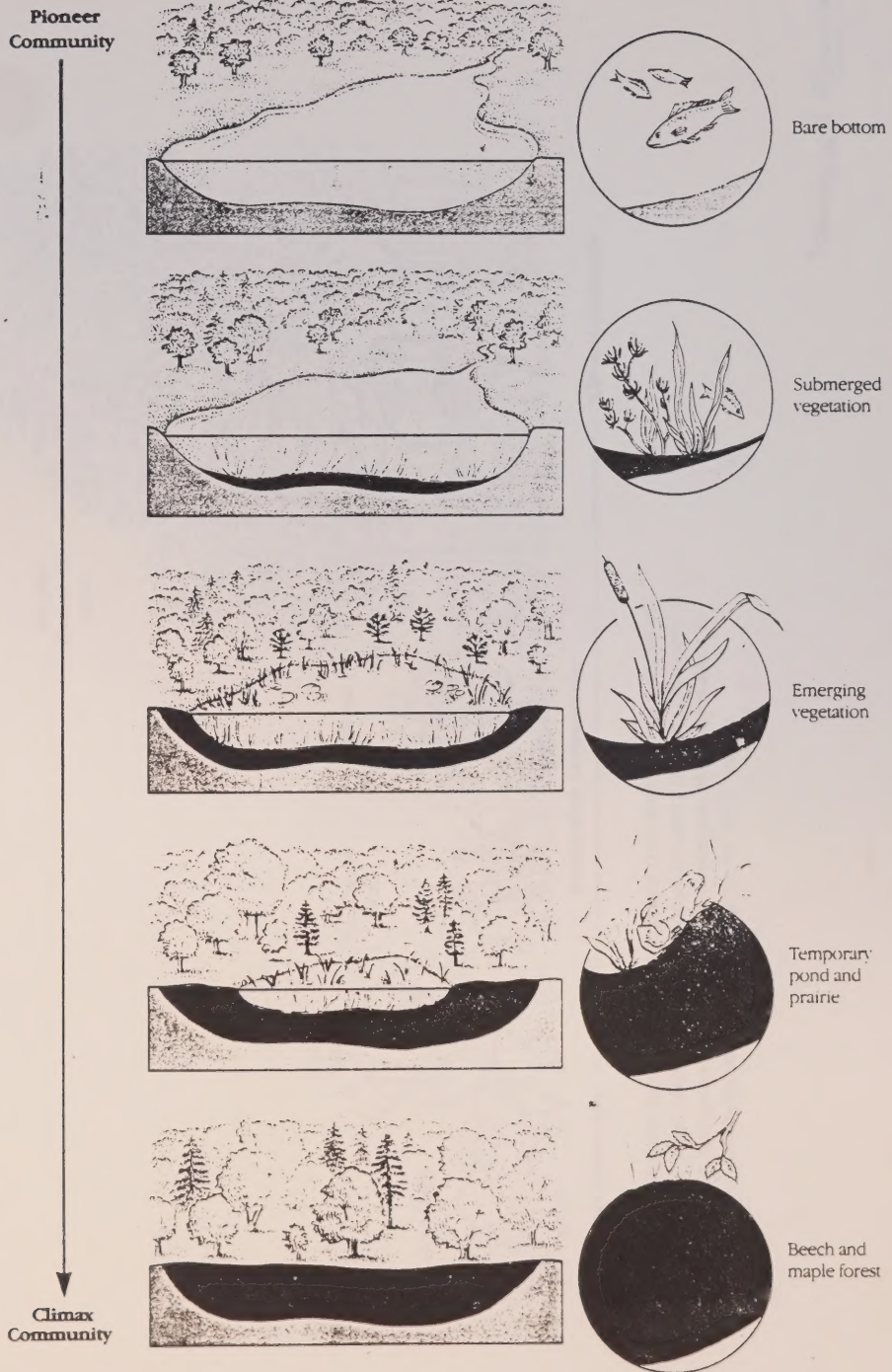
Figure 11.0



Life exists primarily at the intersection of land (lithosphere), air (atmosphere), and water (hydrosphere). As shown here, the biosphere is energized by sunlight

Source: Environmental Science

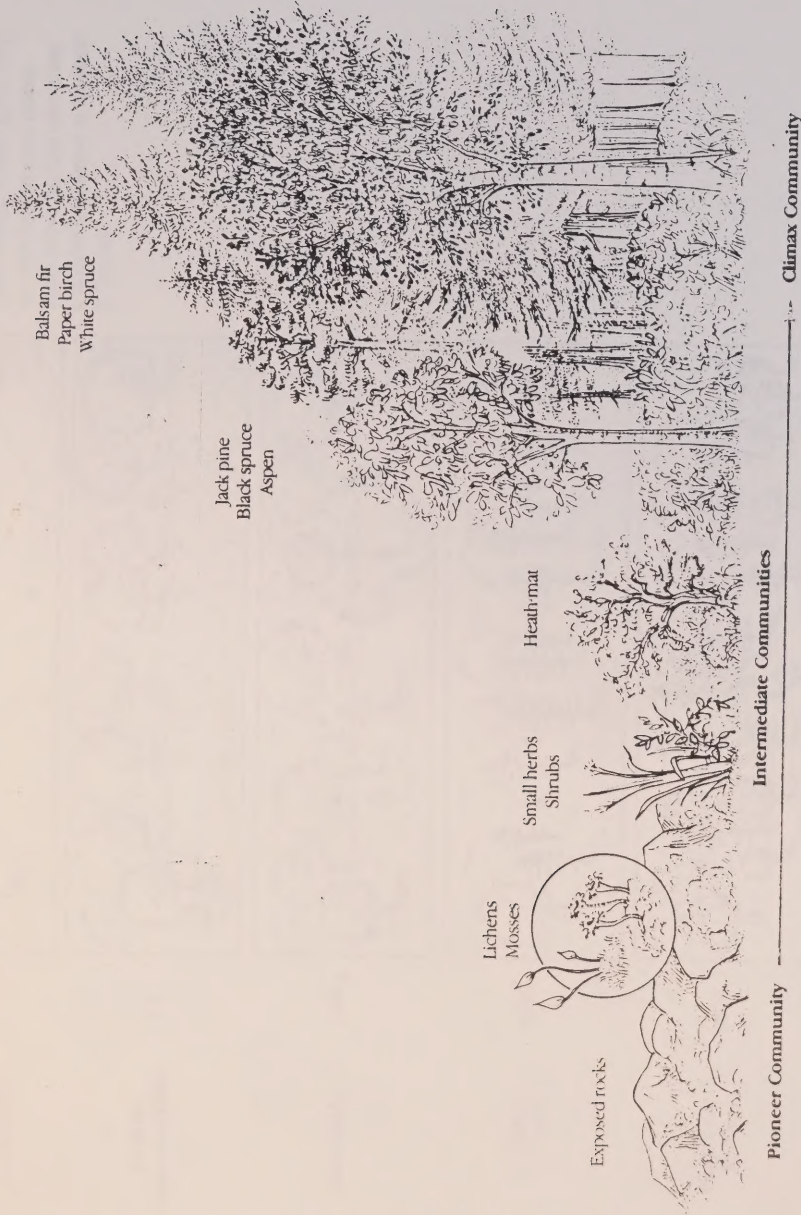
Figure 12.0



Primary succession. In this example a pond is gradually converted into a forest ecosystem. Sediments accumulate on the bottom. Bottom-dwelling vegetation takes root. A series of biotic communities develops until the mature ecosystem is reached.

Source: Environmental Science

Figure 13.0



Primary succession. Here, exposed rock goes through a series of changes as one biotic community replaces another until a mature community is formed. During succession the plants of each community alter their habitat so drastically that conditions become more suitable for other species.

Source: Environmental Science

Figure 14.0

Secondary succession. Here, abandoned eastern U.S. farmland is gradually replaced by crabgrass, which in turn gives way to other herbaceous plants. Trees move in, and over time a mature hardwood ecosystem is formed.



Source: Environmental Science

Figure 15.0

MISSISSIPPI FLYWAY



UNITED STATES DEPARTMENT OF THE INTERIOR • FISH AND WILDLIFE SERVICE

1987 0000 0-0-00-0000

Source: Environment in Transition

Figure 16.0

ATLANTIC FLYWAY



Soils

Fred Bernard

ABiotic SUB-MODEL - SOILS COMPONENT

Frederick Bernard

JPG 1413

This chapter summarizes the findings on the research of soils in the East Bayfront/Port Industrial Area in relation to the criteria of "clean" and "green" as outlined in the report of the Royal Commission on the Future of the Toronto Waterfront (hereinafter referred to as the Royal Commission). It also outlines the benefits and costs, with regards to soil quality, brought about by the Toronto Harbour Commissioners' (THC) proposal as well as the Royal Commission Proposal.

BACKGROUND:

Soil Stratigraphy

The Toronto Port Industrial District was created by lakefilling in accordance with the THC's Waterfront Plan of 1912 (Munson, 1990). Originally, the wetlands at the mouth of the Don River were varied consisting of open water in some areas and islands of emergent vegetation in others (Royal Commission, 1990). Six layers of soils and bedrock have been identified in the area but two layers, the uppermost, consisting of excavated materials, construction rubble, asphalt, sludge, and ash, and the layer immediately underneath which consists of silty and sandy material appear to be most critical for this study.

Historical Land Uses Affecting Soil Quality

Two recent studies, one conducted by Beak Consultants for The THC and the other, prepared by Intera Kenting for the Royal Commission

on the Future of the Toronto Waterfront, have provided a historical profile of land use in the study area.

The Intera Kenting report identifies 123 industries spread among eleven major industrial sectors in the East Bayfront/Port Industrial Area, while the Beak report identifies over 100 tenants/owners whose businesses can be divided into ten land use categories. Both studies indicate that petroleum refining and other petroleum related industries as well as coal storage and distribution have historically been the two most common types of industries found in the study area. These two industries, along with primary metal industries and metal recycling comprise 55% of historical and current land use. (Beak, 1990). Table 1 summarizes the finding of the Intera Kenting Report.

Historical land use can have an important impact on present soil quality. Of the industries most commonly found in the area, petroleum refining, primary metals, tar distillation and chemical storage have had the most adverse impact on soil quality (Beak, 1990). Based on land use patterns four main types of contaminants have been identified in soils within the study area; metals, hydrocarbons, polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs). Other contaminants such as solvents and degreasing agents are also likely to be found in the soils of the study area (Beak, 1990).

CURRENT STATUS OF SOILS IN THE EAST BAYFRONT /PORT INDUSTRIAL AREA

Table 2 lists various land use categories and the potential contaminants resulting from their uses. The Intera Kenting report indicates that MOE decommissioning guidelines for oil and grease were exceeded in 16 to 60 percent of the soil samples taken from petroleum related establishments. The MOE decommissioning guideline for fresh oil is 10,000 ppm and 20,000 ppm for weathered oil. However, the majority of samples taken in the study area had levels ranging between 11,000 and 170,000 ppm (Intera Kenting, 1990).

Organic vapour concentrations measured in boreholes and shallow probe holes at five petroleum sites were in some instances greater than the 100 percent lower explosive limit, a level indicating an explosive hazard in soil air. The Intera Kenting study identified PAHs at various concentrations. Generally, the highest PAH levels were found in soils with the highest oil and grease concentrations (Intera Kenting, 1990).

Various metals, including, lead, zinc, copper and mercury, have been identified in soils within the study area (case, 1990, Intera Kenting, 1990). These metals were found to exceed provincial guidelines in a significant number of samples.

In addition to contamination caused by industrial activities, it is believed that backfilling contaminated materials in the area might

have added to the soil contamination problem. A Study done for the Metropolitan Toronto Works Department indicated that sewage sludge from the main treatment plant, incinerator ash from the main generating station and municipal refuse have been used as backfill near the base of the Leslie Street Spit (Proctor, Redfern, Bousfield and Bacon, 1964).

Volatile organics have been found to be less detectable in some studies but Benzene, Toluene and Xylene have been detected. PCBs as well as PAHs, measured at non-petroleum sites within the study area, were found to be in non-compliance with provincial guidelines (Intera Kenting, 1990).

"CLEAN" AND "GREEN" PRINCIPLES:

A review of the nine principles outlined in the Royal Commission report on the Toronto Waterfront and the goals outlined in the THC "Concept Plan for the Port Industrial Area" indicates that of all the principles listed two, clean and green, are most applicable to the study of soils in the Port Industrial Area.

Ideally, clean means that the soil should be free from all contaminants. Realizing, however, that much of the soils in this area are already contaminated and that it is virtually impossible to return such soils to their pristine state, clean has to be considered in the context of usage as outlined in the Ontario Ministry of the Environment (MOE) soil guidelines. Guidelines for

re-use for residential, parkland and agricultural uses are much more stringent than those for re-use for commercial or industrial activity. Thus, soils designated "clean" for industrial development are not necessarily "clean" for residential development. See Table 3.

There are various indicators of clean. As was indicated earlier, the MOE has guidelines for contaminant levels in soils. These guidelines are adopted here as one of tools for measuring clean soils. It is recognized that these non-uniform guidelines outlined in Table 3 do not seem to fit the principles of sustainable development, however, these are adopted since they are the only scientifically derived guidelines available.

The productivity and diversity of various plant species for example, are dependent on the quality and availability of soils for plant growth. Many of the native plant species in the area appear to be thriving well despite the degraded soil quality. Saline and compacted soils in the area, however, seem to hinder plant growth (Barret, 1990). Similarly, the quantities and types of indigenous soil organisms such as earth worms and certain wildlife, are also useful indicators of soil quality.

Human health is also an important indicator of clean soils. The health of a community is greatly impacted by the quality of soils to which the public is exposed. Soils contaminated with heavy

metals for example, have been known to have various adverse impacts on human health.

The principle of "green" refers to the protection and restoration of the diversity and productivity of ecological communities in the East Bayfront/Port Industrial Area. The quality of soils have a major role to play in this respect. Polluted soils cannot support ecological productivity or diversity. The key indicator of green will be the ability of soils to sustain productivity and diversity of ecological communities within the study area. Since clean soils are necessary for the achievement of the green objective, the principle of green, is not completely separate from clean.

ADVANTAGES OF THE ROYAL COMMISSION PROPOSAL WITH REGARDS TO CLEAN AND GREEN:

A key advantage of the Royal Commission's proposal, is its proposed thorough environmental audit of soils in the study area, followed by soil remediation, where necessary, to be implemented by a Waterfront Regeneration land trust. In fact, Phase One of the audit has already been completed. The audit, though not a solution in itself, can provide much needed information on the types of contaminants in soil and overall soil quality of the entire study area thus, allowing for a more integrated strategy for soil remediation. The current practice of site - specific clean-up does not foster an integrated approach to remediation nor does it allow for a thorough analysis of soils throughout the whole area.

The Royal Commission proposal to create major new parkland along the central waterfront is essential to achieving the objectives of clean and green in at least some parts of the study area. Key ingredients of this proposal include the creation of a continuous Waterfront Promenade along the entire East Bayfront/Port Industrial Area, an expansion of Cherry Beach Park to comprise over 80 hectares and the development of the outer Harbour Marina Area as a Waterfront Park under the jurisdiction of the City of Toronto.

These proposals are essential to achieving both clean and green objectives in two ways: First, to create such green areas, soil remediation will be required to comply with provincial guidelines for Parkland; and second, assuming that remediation is successful, certain industrial activities likely to cause soil pollution will be excluded from such areas.

One of the key proposals of the Royal Commission is the creation of a centre for Green Enterprises and Industry under the Management of the Toronto Economic Development Corporation (TEDCO). Such a centre will be given the mandate to foster business and manufacturing practices and processes that are "environmentally friendly" (Royal Commission Watershed, 1990). It is assumed that such a proposal would promote "new industry" where jobs are based on contributing to the knowledge and information rather than industries with smoke stacks, such as the types which cause soil pollution.

The Royal Commission proposes that TEDCO be given a major role in revitalizing industry in the Central Waterfront, particularly in the East Bayfront/Port Industrial Area, through the creation of a Waterfront Industrial Park. The park would be geared to attracting light industry which would replace some of the heavy industries which are already leaving the area. These two forces working simultaneously can have a significant positive impact on soil quality in terms of reducing heavy industry pollution.

The Royal Commission also proposes the creation of a Don Valley wildlife corridor. The creation of a green corridor together with an expansion in Parkland will provide opportunities for species productivity and diversity. At the same time, this preempts certain soil polluting activities from these designated green areas.

DISADVANTAGES OF THE ROYAL COMMISSION PROPOSALS WITH REGARDS TO CLEAN AND GREEN:

Although the Royal Commission recognizes the need for soil remediation, it does not provide any concrete strategy as to how remediation should be undertaken. The Commission recommends that a Waterfront Regeneration Land Trust be formed to define and implement soil remediation strategy, but there is no guarantee that such a body will be formed. While the soil audit can provide useful information on soil quality a clear strategy for remediation is also necessary.

Also, the Royal Commission does not outline concrete plans to curb soil pollution by existing industries in the area. Furthermore, private land owners have no legal obligation to remediate their property, unless ordered to do so by the MOE, or during redevelopment (Beak, 1990).

ADVANTAGES OF THE THC PROPOSAL WITH REGARDS TO CLEAN AND GREEN:

Like the Royal Commission, the THC proposes that Cherry Beach be enlarged and improved to enhance recreational activities. (Port of Toronto News, 1988). As was indicated earlier, it is assumed that once an area is designated as parkland that some level of soil remediation will be required and that certain soil polluting activities will be curtailed or halted.

The THC proposes maximizing the use of the Port Area's dock wall, ship channel and rail investments, thereby freeing lands for other opportunities such as recreational activities (Port of Toronto News, 1988). The freeing of lands for recreational activities will require that such soils be clean, either in their present state or through remediation. This also creates tremendous opportunities for the greening of such areas.

A key green objective of the THC is to create a link between Cherry Beach Waterfront Park and the Don Valley and Central Bayfront by means of open spaces and roadway realignment (Port of Toronto News, 1988). This can have a positive impact on soil quality by limiting

and/or forbidding certain heavy industrial activities, including transportation, which are likely to cause soil pollution.

The THC proposes the creation of business parks south of the ship channel as well as improvements to Commissioners Street with the co-operation of existing landowners and long-term tenants on a voluntary Industrial Improvement Area (IIA) basis (Port Industrial News, 1988). Communications with Mr. Mark Conway of the THC indicated that light, non-polluting industries such as computer parts assembly, rather than heavy industry will be the focus of these industrial parks. Should this be the case, the contribution of heavy industrial activities to soil pollution would be greatly reduced in such areas.

DISADVANTAGES OF THE THC PROPOSAL WITH REGARDS TO CLEAN AND GREEN:

Like the Royal Commission, the THC recognizes that the soils in the study area require costly remediation, and like the Royal Commission it fails to stipulate the time frame and means of financing soil clean-up. Communications with THC officials reveal that that body is prepared to bear at least some of the costs of remediation but a detailed strategy has not been formulated.

Economic viability appears to be the primary concern of the THC and benefits such as clean soils for recreational areas are tied to the economic objective. The THC proposal seems to suggest that lands will be considered first for their industrial economic value and

designated as such, which will then free up other lands for recreational activities.

SUMMARY:

Overall, there appears to be very little difference between the THC and the Royal Commission proposals regarding objectives of "clean" and "green" with respect to soils. In fact, the similarities between the two proposals far outnumber the differences and for this reason it is difficult to state which of the two proposals will have a more positive or less adverse impact on soil quality. The implementation of any one of the two proposals will have a very positive impact in terms of improving soil quality in the study areas as shown in Table 4.

Based on the information in "watershed" and the "THC Concept Plan" as well as information obtained from interviews with officials from the THC and the Royal Commission, it appears that the THC proposal has two clear advantages over the Royal Commission's proposal.

The first advantage is the fact that the THC proposal is consistent with initiatives taken by the THC regarding soil remediation. The THC has already researched various options for soil remediation including acid wash techniques, in-situ remediation and containment. The THC has already been involved with soil remediation activities in the study area and already enjoys a working relationship with the area's tenants.

The second advantage of the THC proposal, is that the THC, more than the Royal Commission, have at least verbally considered various aspects of soil remediation costs. The THC have already sought the advice of consultants on issues such as the aspects of contaminated soils, co-ordination of landowners and tenants who may wish to be involved in a comprehensive approach, and liability and costs implications (Munson, 1990). Such information has helped the THC to provide, for example, estimates of remediation costs on a per acre basis.

Based on these two key advantages it is recommended that the THC proposal on soils be adopted.

TABLE 1

SUMMARY OF FORMER INDUSTRIAL ACTIVITIES

<u>INDUSTRIAL ACTIVITY</u>	<u>NUMBER OF SITES WITH SIMILAR FORMER LAND USE</u>
Petroleum Product Storage, Refining and Distribution	38
Coal Storage and Distribution	39
Primary Metal Industries and Fabricated Metal Products	23
Offices and Retail/Wholesale Outlets	16
Docking and Trucking Facilities	14
Food Processing, Storage and Distribution	10
Chemical and Building Product Storage and Distribution	10
Metals Recycling	10
Vacant Land - Parkland	10
Tar Distillation and Briquetting Plants	5
Miscellaneous	30
- Incinerator	
- Commercial Refrigeration Equipment	
- Aggregate and Cement Industries	
- Paper and Allied Products	
- Wood Industries	
- Glass and Plastic Industry	
- Hydro Substations	
- Sewage Treatment Plant	
- Works Yards	
- RCAF Storage	

(Source: Intera Kenting, 1990)

TABLE 2

**LAND USE CATEGORIES AND POTENTIAL CONTAMINANTS
IN THE PORT INDUSTRIAL DISTRICT**

Land Use Category	Potential Contaminants
1. Oil Companies	
- bulk storage farms	- high hydrocarbons
- refineries	- high hydrocarbons
- terminals	- high hydrocarbons
2. Coal Yards	
- storage	- low PAHs
- briquette manufacturing	- low PAHs
3. Metal Processing/Storage	
- foundries	- high metals
- machinery manufacturing	- high metals
- scrapyards	- high metals, high PCBs, low hydrocarbons
- metal recyclers	- high metals, high PCBs, low hydrocarbons
4. Chemical Processing/Storage	
- coal distillation	- high PAHs
- general chemical processing/storage	- dependent on chemical, may be indicated by low hydrocarbons or low PAHs
5. Construction Yards	
- general construction contractors	- low metals, low hydrocarbons
- demolition contractors	- low metals, low hydrocarbons
- building supplies	- low metals
- cement storehouses/ cement batching plants	- low metals

Land Use Category

Potential Contaminants

6. Freight Handling/Transportation

- marine terminals/dockyards - low metals
- cartage - low metals, low hydrocarbons

7. Light Industrial/Commercial

- paper products manufacturing/recycling - low metals
- food products - low metals
- non-metallic minerals storage - low metals
- general warehousing - low metals
- offices - low metals
- parking lots - low metals
- educational institutes - low metals

8. Utilities

- hydro-electric generating station - low metals, low PCBs, low PAHs
- hydro-electric substations - low metals, low PCBs

9. Parkland/Recreation

- low metals

10. Miscellaneous

- incinerator - high metals
 - fly ash disposal basin - high metals
 - undeveloped land - low metals
 - snow dumping area - low metals
 - wood chipping area - low metals
-

TABLE 4

ABIOTIC SUB-MODEL - SOILS COMPONENT

Assessment of Impacts of the Proposals
with Regards to Clean and Green

Objective	THC	ROYAL COMMISSION
1. Foster compliance with MOE Soils Guidelines	2	2
2. Promote environmentally friendly industrial development which reduces soil pollution	2	2
3. Reduce adverse impacts on terrestrial species including soil organisms	2	2
4. Reduce possible adverse impacts of degraded soil quality on human health	2	2
5. Reduce groundwater contamination resulting from polluted soils	2	2
6. Reduce soil pollution through a complete remediation strategy	2	1
7. Increase the possibility of expanding green areas through remediation	1	2
8. Cost considerations relevant to a soil remediation strategy	2	1

REFERENCES:

Beak Site Remediation Services (1990). "Strategy for the Decommissioning of Soils in the Port Industrial District, Toronto, Ontario", prepared for The Toronto Harbour Commissioners.

Intera Kenting (1990). "Environmental Audit of the East Bayfront/Port Industrial Area Phase 1: Soils and Groundwater", Technical Paper No. 4, prepared for The Royal Commission on the Future of The Toronto Waterfront.

Proctor, Redfern, Bousfeld and Bacon (1964). "Landfill Study for Waterfront Development. Toronto: Metropolitan Waterfront Technical Committee.

Port of Toronto News (1988). Vol. 35, No. 3.

Ontario Ministry of the Environment (1989). Guidelines for the Decommissioning and Cleanup of Sites in Ontario, Waste Management Branch.

Royal Commission on the Future of The Toronto Waterfront (1990). "Watershed", Interim Report.

Royal Commission on the Future of The Toronto Waterfront (1990) East Bayfront and Port Industrial Area: Environment In Transition", Ministry of Supply and Services Canada.

Munson, William E. (!990). "Soil Contamination and Port Redevelopment In Toronto", Working Papers of the Canadian Waterfront Resource Centre - No. 3 Ministry of Supply and Services Canada.

Personal Communication

Barret, Susan - Technical Expert with The Royal Commission on the Future of The Toronto Waterfront.

Case, Glenn - Senior Engineer and Soils Expert with SENES Consultants Limited.

Conway, Mark - Technical Expert for THC.

Air

Judy Pucher

The air quality in the Toronto Port Industrial Area is affected by various pollutants emitted by both local and distant sources. The levels of these pollutants in the air depends not only upon the actual emission levels but also on the topography, urban structure and prevailing weather conditions. Therefore, although the overall air quality is relatively poor with respect to certain pollutants in the Port Industrial Area, the air quality nevertheless fluctuates over time and location. The Toronto Harbour Commissioners (THC) as well as the Royal Commission on the Future of the Toronto Waterfront (RCFTW) have each proposed development plans for the Port Area, which could potentially impact the local air quality. Therefore, in order to determine these impacts, all the factors that influence air quality have to be taken into account in order to assess which is the better plan for the Port Area with respect to air quality.

The Port Industrial Area does not differ from the rest of Toronto with respect to certain pollutant levels, since the levels of these are affected predominantly by very distant or regional sources.⁴ For example, levels of ozone and toxic organic compounds are more or less uniform throughout the Toronto region and are attributed mainly to distant sources in the United States. Likewise, sulphur dioxide and nitrogen dioxide levels in the air are influenced mainly by regional sources and hence also differ very little across Metro Toronto. The levels of nitrogen dioxide have not changed much in the last fifteen years despite tighter pollution controls because the number of cars on the road has continued to increase in this time. Nitrogen dioxide is not

considered a problem as a pollutant itself in the Toronto area, but is mainly a concern due to its role in the formation of ozone. Sulphur dioxide levels are well within the provincial criteria in the study area, especially since these levels have been reduced by 90% since the 1970s. There are pollutant levels however that are influenced mainly by sources in or just adjacent to the East Bayfront and Port Industrial Area. These include levels of: carbon monoxide, suspended particulate matter, dustfall, airborne lead, soil contamination as well as odours and noise. The levels of these pollutants significantly affect the local air quality, especially since these often exceed provincial criteria. It is therefore important to examine how the two proposals could potentially affect these pollutant levels in the Port Industrial Area.

Carbon monoxide concentrations are attributed mainly to the emissions of road vehicles, which accounted for about 87% of all carbon monoxide emissions in 1985 in Metropolitan Toronto.⁴ The amount of carbon monoxide in the air due to this source furthermore, increased by 20% from 1980 to 1985. These emissions are believed to often exceed the provincial criteria in the Port Industrial Area near the exit ramps of the Gardiner Expressway and the Lakeshore Boulevard. Such high levels can cause cardiovascular problems, dizziness and headaches in humans, particularly, if they smoke.

Carbon monoxide levels can be expected to increase in the Port Area since both plans anticipate the area to be much more utilized by people in the future. For example, while there were less than

5,000 people employed in the Port Area in 1985, in the future there will be between 25,000 to 70,000 people working there according to the RCFTW plan and about 50,000 according to the THC plan.² Furthermore, both plans foresee the area as being highly visited in the future for its parkland. For both plans therefore, there is a significant potential increase in automobiles. There are a number of humanly controllable factors that will affect carbon monoxide levels however, no matter how many people will be using the Port Area. These factors include: 1) the number of automobiles (and their future emission control efficiencies), 2) road design and 3) buffer zones of controlled land usage.

Although there may be more people employed in the Port Area under the RCFTW plan, the RCFTW also proposes that the area must be accessible in many ways, including by public transit.³ This naturally would decrease the number of automobiles and hence carbon monoxide emissions. Although the provision of public transit is not explicitly part of the THC plan, the THC believes that an improvement in transit will be a natural consequence of the implementation of its plan because there will be a demand for it.⁵ It seems however, that the RCFTW is more serious about implementing an efficient public transit system sooner, since it does not want to devote too much land to parking lots, but rather to green space, which simultaneously would make the waterfront affordable to all income groups as well as less polluted. The air quality would therefore be less negatively impacted if these RCFTW measures were taken.

Road alignments are being considered by both

parties, which is important for improving the overall circulation and integration of the area with the city. It is important to keep traffic moving smoothly, since carbon monoxide levels increase when traffic is heavy and slow.⁴ The RCFTW proposes the dismantling of the elevated portion of the Gardiner Expressway over a twenty year period, during which time public transportation and arterial roads would be improved in order to provide sufficient transportation capacity. This should improve and minimize the flow of traffic in the future in the Port Industrial Area. The THC plan is also still investigating road alignments and is planning for the extension of the Don Valley Parkway to Cherry Beach Park. Although this would probably speed up the flow of traffic into the Port Area, it may also cause it to become more congested inside the Port Area. This could increase the carbon monoxide pollution within the area, which otherwise may have been more concentrated outside the area (ie. along the Gardiner Expressway and Lakeshore Boulevard). Therefore although both proposals plan for the improvement in roads for traffic circulation (although nothing is definite yet), the RCFTW plan is better in that it plans for improved public transportation while these road constructions are taking place. Finally, buffer zones are important for reducing air pollution, by allowing better air circulation. The RCFTW plans to do this not only through the construction of low-rise buildings but also through the provision of open green space. For example, a buffer green space is planned for along the Lakeshore Boulevard from the Don Valley Parkway to Leslie Street, along Leslie Street and along the other major arteries that segment the study area. This allows for the

planting of shrubs and trees (as has been proposed), which would further reduce air pollutants (unless the pollution levels are so high as to kill the trees). The THC has made a proposal for a buffer zone around the two business parks, the transitional industrial area and along one side of the extended Don Valley Parkway. No open green space appears to be planned for along the Lakeshore Boulevard or within the main industrial area itself, nor near the east end between the industrial park and the sewage treatment plant, where a retail strip is planned. Therefore, taking all of the above factors into consideration, the RCFTW has made somewhat better plans than the THC for controlling the inevitable increase in carbon monoxide emissions (as well as other automotive emissions), which needless to say, makes the plan even more expensive than the very costly THC plan.

Suspended particulate matter, dustfall, odours and noise all have similar sources, since they are mainly associated with industry and with traffic. The impact of these pollutants is relatively localized. Therefore, the extent of their impact depends largely on the type and number of sources, as well as their location and the prevailing weather conditions.

Suspended particulate matter consists of particles small enough to remain suspended in the air.⁴ It can affect human health when it is made up of particles small enough to penetrate the lungs. Otherwise this type of pollution is considered a nuisance, as it impairs visibility and results in soiling. Since the RCFTW plan proposes less land to be devoted to industry, it is assumed that there would be fewer industrial activities present emitting this

type of pollution. The opposite holds true for the THC plan, which proposes a greater area to be devoted to industry. Also, since the RCFTW plan proposes more explicitly the move from heavy to light industry and particularly emphasizes the introduction of green industry, it is believed that this type of industrial pollution would be eliminated or better controlled.¹ This is assumed since the creation of a center (called the Centre for Green Enterprise and Industry) is proposed, which would be involved in research and development that investigates the possibilities of making industry more compatible with the environment. This therefore should be reflected in the activities in the Port Industrial Area, especially since the center would also be involved in providing education in this field. The levels of suspended particulate from industry could naturally be controlled through the use of technology under the THC plan as well. It would however result in a higher cost due to a greater amount of industry. In neither case would there be perfect improvement because of the suspended particulate matter associated with the Gardiner, although again, the RCFTW plan makes better provisions for this with the buffer green belt. Therefore, although there would probably be a slight improvement in the levels of suspended particulate matter under the THC plan (due to a move from heavy to light industry and improvement in technology), it is expected that the RCFTW plan would fare even better because there would be less land devoted to industry and there would be a greater commitment to reducing pollution levels.

Dustfall differs from suspended particulate, in that the particles are heavier and hence fall to

the ground. Again the major sources in the Port Industrial Area are along the major traffic arteries and near industrial areas where material like sand, coal and gravel are stored in bulk. Dust can affect human health when it contains toxins, such as lead, as is the case near certain industries (eg. Canada Metal Plant).⁴ Dustfall can also be poisonous to vegetation as in the case of salt or it may impair photosynthesis and hence growth if dustfall is heavy. Again it is assumed that because the RCFTW plan proposes less area to be devoted to industry and that this industry would be mainly of the green type, there would be less of a dust problem than in the THC plan. Another reason why there may be more of a dust problem under the THC plan is due to the large and extended area devoted to port facilities and bulk storage areas. Problems may arise from this, considering that the winds are often quite strong during certain times of the year and blow most frequently from the west. There may be a lot of dust blowing at times in the direction of Cherry Beach Park and the business park, making these areas less attractive, and potentially affecting human health. If this problem is to be minimized through the use of technology, then costs will run higher under the THC plan. Eventhough there will be less industry and port activities will be concentrated in a smaller area under the RCFTW plan, the dust problem will not be totally alleviated because of the dust associated with traffic. Nevertheless, there will be good improvement again under the RCFTW plan and this will come relatively cheaply, since it will be based on the replacement of heavy industry by light industry and a reduction in port activities.

Odours are associated with certain industrial activities that involve emissions of sulphide and organic compounds, which are most often well within the air standards but are nevertheless very odourous in concentrations as low as a few parts per billion.⁴ Again it is assumed that the differences between the two proposals regarding port and industrial activities, would result in less odours under the RCFTW plan. Furthermore, since there is some residential use of the land planned, it is assumed that more stringent standards will have to be followed with respect to this type of emission. Again however, as in the case of dust and suspended particulate matter, the odour problem will not be completely alleviated, because of the increased volume of traffic. Nevertheless the odour problem is more likely to be improved under the RCFTW plan.

The noise problem is very similar to the of odour problem. Again it is assumed that lighter and less industrial activity will contribute to a reduction in noise levels, as will the planting of trees under the RCFTW plan, while increased traffic on the other hand, will increase levels. The expanded port facilities in the THC plan will increase noise incidences over a wider area, unlike under the RCFTW plan, where port facilities would take up a smaller and more peripheral area.

Finally, it is realized by both plans that contaminated soils have to be cleaned up before any development can take place, since indoor air quality can be affected by volatile compounds, which may reach health impacting levels. It is assumed that in either case good standards would have to be met and that costs would run very

high. This topic is covered in greater detail under the soils section.

In conclusion, it is evident that the RCFTW plan has the potential to improve the air quality to a greater extent than the THC plan. Even if there would be a move to light industry under the THC plan, there would still nevertheless be more industry. This would result in more gaseous pollutants, suspended particulate matter, dustfall and odours than under the RCFTW plan. Likewise, an expansion of the port activities would increase the above mentioned pollutants even more, as well as contributing to an additional source of noise, which may not be compatible with the adjacent land use (eg. Cherry Beach Park). Furthermore, it is questionable whether the port activities should be expanded, considering the fact that global warming may take place within the next decades, which could lower lake levels considerably.⁴ This would mean either that the harbour would have to be dredged or that ships would have to carry a lighter cargo, if shipping is to continue. If ships carry a lighter cargo, there could possibly more ships coming in and out of the harbour especially if the shipping season is extended due to a longer ice free season for the St. Lawrence Seaway. This then would adversely affect the air quality and could possibly limit options for adjacent land uses.

Overall therefore, the RCFTW has made better plans to harmonize the various activities at the Port Industrial Area, making it the better plan with respect to air quality.

Water Quality

Arnold Gurtner

The writer's intention is to assess the impacts of two Area Concept Plans (established by the Toronto Harbour Commissioner (THC) and the Royal Commission on the Future of the Toronto Waterfront (RCFTW) on the water quality in the East Bayfront and Port Industrial Area. The assessment includes the evaluation of the **surface water quality** (waters of the harbour and the channels) as well as the **ground water quality**. The information on the Concept Plans was derived from reports from the THC (1988) and the RCFTW (1990c) which contain the actions the two bodies want to take in the future. For the assessment feasibility and the costs of the measures will not be discussed, rather it will be assumed that all recommendations will be translated into action.

1. Surface and ground water conditions in the East Bayfront and Port Industrial Area

Water quality parameters

For the assessment of water quality in terms of human or environmental health several standards on different levels of legislation (federal, provincial, municipal) exist. For the purposes of an EIA of two proposals concerning land use options **provincial guidelines and policies** are most relevant since environmental protection is principally a provincial responsibility. Provincial guidelines for water quality are primarily set with respect to the use of the water concerned. The most suitable guideline for the assessment of surface and ground water quality in the study area are the **Provincial Water Quality Objectives (PWQO)** which address the impact of water on aquatic habitat and recreational uses (Ontario Ministry of the Environment 1984). The Provincial Water Quality Objectives provide standards for the pollution of surface waters (level of eutrophication, bacteria, clarity, metals and organic compounds) as well as standards for ground water quality (concentration of phenol, volatile organic components VOC, heavy metals and PCB's).

For the assessment of **surface water quality** in the East Bayfront/Port Industrial Area the following parameters are crucial:

- **Phosphorus and nitrogen** (indicators for eutrophication), PWQO for both parameters: 0,02 mg/l.
- **Fecal coliforms** (bacteria), PWQO: 100 Fecals/100 ml.
- **Turbidity and suspended solids**, PWQO for turbidity: 10% secchi increase (=10 mg/l suspended solids increase)
- **Metals** (e.g. lead, copper, iron, zinc),

PWQO for lead:	0,005 mg/l
PWQO for copper:	0,005 mg/l
PWQO for iron:	0,3 mg/l
PWQO for zinc:	0,016 mg/l
- **Organic contaminants, especially PCB**. PWQO for PCB's: 0,001 ug/l.

For ground water quality we consider the following parameters:

- **Phenol**, PWQO: 0,001 mg/l.
- **Volatile organic compounds**, PWQO for benzene: 0,02 gm/l

PWQO for toluene:	0,0004 mg/l
PWQO for xylene:	0-0,001 mg/l
- **Heavy metals**, see above.
- **PCB**, see above.

The criteria established in the Provincial Water Quality Objectives will as far as possible be used for the evaluation of the proposals and for the operationalization of the goals of the Royal Commission and the THC. In doing so the objectives represent the **standards for water quality** which should not be exceeded by the actions outlined in the Concept Plans. With regard to the goals of sustainable development it would even be appropriate to apply the most **sensitive** guideline that exist (eg. the federal objectives for some heavy metals as lead and copper are tougher than the provincial standards).

Surface water conditions

A review of studies which have mainly focused on specific, water-related objectives along the Toronto Waterfront (for a summary see RCFTW 1990b) shows that the **water quality in the East Bayfront and Port Industrial Area** can generally be described as **poor**. According to POULTON/GRIFFITHS (1986) the Toronto Harbour can be divided into six **zones with different water quality**. Two of them (the Inner Harbour and the Keating Channel) are badly degraded. They have eutrophic water and impaired sediment conditions and belong to the worst areas along the Toronto Waterfront which is designated as an "area of concern" by the International Joint Commission on the Great Lakes Water Agreement.

The surface water quality in the study area is affected by many sources which generally originate outside the area. The major source of contaminants is the **Don River** which discharges pollutants from the whole watershed into the Toronto Harbour. Water quality parameters in the lower Don River frequently exceed most of the PWQO. The Don River is the major conduit of sediments, heavy metals, PCB's and contains high levels of phosphorus and nitrogen. Another important pollution source is the **Main Water Pollution Control Plant** which discharges into Ashbridges Bay. Its effluents contribute to a reduction in the water quality of the Eastern Waterfront, and especially to eutrophic conditions. Further, contaminants in the **ground water** runoff from the Port Industrial Lands are an origin of pollution to the waters of the Harbour. Lake Ontario is the lowest point in the Greater Toronto Area and therefore the eventual point of discharge for ground water within the study area.

Ground water conditions

Data on ground water quality were obtained from decommissioning reports of petroleum product storage and refining facilities, and a coal tar manufacturer (RCFTW 1990a). They represent therefore probably the worst case conditions for ground water impacted by industrial processes in the area although **industrial activities** are without doubt the major source for ground water pollution in the Port Industrial Area.

At most sites Provincial Water Quality Objectives were **exceeded** for one or more guidelines. Ground

water data usually included metals and the organic parameter phenol. Total volatile organic compounds were measured at most sites, oil and grease which are immiscible in water were found at three, and PCB's were measured at one site.

2. Impacts of proposals

Differences between the proposals of THC and Royal Commission

Major differences between the THC and the Royal Commission proposal refer to **the extent and the kind of industrial activities, the extent of green and open spaces, remediation and activities outside the study area** (see Table 1).

Industrial activities: Both proposals include to a certain degree a shift from "heavy" to light or High-Tech industries. Undoubted the THC proposal schedules a larger area for industrial use than the Royal Commission's plan. While the THC expects a mixed industrial structure the Royal Commission's project emphasizes light and technologically-advanced industries.

Green and open spaces: Royal Commission's plan includes more green spaces than the THC proposal.

Remediation: One of the major suggestions of the Royal Commission is the remediation of cotaminated Port Industrial lands. In comparison, the THC report is silent on the management of this problem.

Activities outside the study area: While the THC proposal is limited to the Port Industrial Area the Royal Commission assumes through its ecosystem approach a broader point of view, i.e. the Commission recommends activities outside the study area which complement the measures in the study area. Among them is the clean up of the Don River watershed which is crucial for the water

quality in the East Bayfront and Port Industrial Area.

Table 1: THC and Royal Commission Concept's features

	THC	Royal Commission
Port	Consolidated Port Area, consolidation of port activities	Consolidated Port Area, consolidation of port activities
Industry	2 Business Parks, traditional and technologically-advanced)	Industrial Park, including a Centre for Green Enterprise
Green and open spaces	Enlargement of Cherry Beach Park, System of linked open spaces	Enlargement of Cherry Beach Park, creation of a continuous waterfront promenade and a Don Valley Wild Life Corridor
Remediation	--	Creation of a Toronto Waterfront Regeneration Land trust (mandate: remediation of PIA lands under its ownership)
Activities outside the study area	--	Clean up of the Don River watershed

after: THC 1988, RCFTW 1990c

Assumptions about implications of land use options on water quality

A shift in land use might have both **direct** and **indirect** impacts on surface and ground water quality. If the effect is beneficial or detrimental fundamentally depends on the **nature** of activity and land use involved:

Port uses normally have a substantial **negative impact** on water quality. Shipping and navigation may seriously impair water quality if spills of oil and/or toxic materials occur and through resuspension of sediments in shallow water. Port uses necessitate dredging activities which may impact water quality in the immediate area for short-terms through the resuspension of contaminants.

Industrial uses usually have a negative impact on water quality through effluent discharges into water bodies. The degree of the impact is completely dependent on the type of industry involved. At present, industrial effluents are discharged into the municipal sewage treatment system, and have therefore only an **indirect impact** on water quality.

Conservation uses (creation of green spaces and preservation of natural habitats) have generally a **beneficial impact** on water quality. For example, natural areas such as marshes can clean water flowing through them by increasing sedimentation of suspended solids.

Remediation of contaminated sites may have a **positive impact** on both surface and ground water quality. Clean up of contaminated soils normally result in an improvement of ground water quality as well as in beneficial effects on surface water quality.

3. Benefits and costs of the proposals in relation to water quality

Among the goals and objectives of the proposals (THC 1988, ROYAL COMMISSION 1990c) **CLEAN**, **GREEN** and **ATTRACTIVE/ATTRACT TOURISTS** have a direct relationship to water quality, and may accordingly be assessed. Generally, degraded surface water quality impairs the cleanness of the natural environment and contributes to a less attractive area (affect the goals **CLEAN**, **ATTRACTIVE** and **ATTRACT TOURISTS**) while impaired ground water quality may affect the growth of plants and the diversity of species (***GREEN**). Thus, **improved water quality means a progression towards the goals.**

Table 2: Benefits and costs of the predicted impacts on water quality

GOAL Indicator	ALTERNATIVE Impacts	ALTERNATIVE 1: THC	ALTERNATIVE 2: ROYAL COMMISSION
CLEAN			
Surface water quality		0	+2
- Level of phosphorus/nitrogen		0	+2
- Bacterial contamination		0	+2
- Level of turbidity and total suspended solids		0	+2
- Concentration of heavy metals		0	+2
- Concentration of organic contaminants		0	+2
GREEN			
Ground water quality		+1	+3
- Concentration of phenol		+1	+3
- Concentration of VOC		+1	+3
- Concentration of PCB		+1	+3
- Concentration of heavy metals		+1	+3
ATTRACTIVE/ATTRACT TOURISTS			
Surface water quality		0	+2
- Level of phosphorus/nitrogen		0	+2
- Bacterial contamination		0	+2
- Level of turbidity and total suspended solids		0	+2
- Concentration of heavy metals		0	+2
- Concentration of organic contaminants		0	+2

Scale: Positive numbers: Positive changes toward the goal - ranging from significant positive (+3) to slight positive (+1)
0 No change induced by the project
Negative numbers: Negative changes away from the goal - ranging from slight negative (-1) to significant negative (-3)

For the measurement of the impacts brought about by the proposals we consider the parameters for surface resp. ground water quality outlined before. Since quantification of the impacts on each criterion is neither possible nor useful (monitoring of the effects on the parameters after the implementation of a plan is the only possibility for a quantitative assessment) the analysis is carried out on the basis of a **qualitative relative scale** (see Table 2). Positive numbers mean a progression toward the goal, negative numbers indicate a regression from the goal.

For the objectives **CLEAN** and **ATTRACTIVE/ATTRACT TOURISTS** (indicator: surface water quality with a set of parameters) the impacts of the changes in land use caused by the **THC proposal** may be negligible. The assessment of the **Royal Commission's proposal** result in a positive change toward the goal. The rationale for this difference are the activities outside the study area, i.e. the **clean up of the Don River watershed** included in the Royal Commission's plan as discharges of industrial activities in the study area have only an indirect and, as shown before, little effect on surface water quality.

A substantial progression toward the goal **GREEN** may be achieved through the **remediation of contaminated sites** planned by the **Royal Commission** and the resulting beneficial effects on ground water quality. A shift in industry and the elimination of leaking, polluting plants included in both proposals represents nothing but a first step towards a "green" East Bayfront and Port Industrial Area.

4. Conclusions

For the East Bayfront and Port Industrial Area improved water quality parameters are important indicators for a progression towards the goals **CLEAN**, **GREEN** and **ATTRACTIVE/ATTRACT TOURISTS**. With respect to the goals the actions included in the proposals of **THC** and **Royal Commission** affect the indicators for water quality differently.

A comparison of the concept's features and the predicted impacts leads to following conclusions:

Conclusion 1: The actions included in the Royal Commission's proposal may produce significant beneficial impacts on surface and especially on ground water quality in the East Bayfront/ Port Industrial Area. In comparison, the effects of the THC concept plan on water quality are likely to be negligible. The favourable assessment of the Royal Commission's plan comes about in consideration of the remediation of contaminated sites and the measures the Commission plans to take outside the area, i.e. the clean up of the Don River watershed where most of the sources of contaminants to the waters of the study area are located.

Conclusion 2: The major sources of pollutants to the waters of the East Bayfront/Port Industrial Area originate from outside the area. Hence, an improvement of the water quality in the study area with respect to the goals of sustainable development can only be achieved through measures which affect the whole Greater Toronto Area.

5. References

- Ontario Ministry of the Environment, 1984: Water Management Goals, Policies, Objectives and Implementation Procedures of the Ministry of Environment, November 1978, Revised May 1984.
- Poulton, D.J./Griffiths, M., 1986: Toronto Waterfront Water Quality 1976 - 1983. Water Resources Branch, Great Lakes Unit, Ontario Ministry of the Environment.
- The Royal Commission on the Future of the Toronto Waterfront, 1990a: Environmental Audit of the East Bayfront/Port Industrial Area. Phase 1. Technical Paper No. 4. Soils and Groundwater.

The Royal Commission on the Future of the Toronto Waterfront, 1990b: Environmental Audit of the East Bayfront/Port Industrial Area. Phase 1. Technical Paper No. 5. Aquatic environment.

The Royal Commission on the Future of the Toronto Waterfront, 1990c: Watershed.

The Toronto Harbour Commissioners, 1988: Port Industrial Area Concept Plan. Discussion paper.

Waste Management

Brian Mierzynski

WASTE SUB-MODEL REPORT

Introduction

In any analysis of the goals and objectives of the Toronto Harbour Commission (THC), and the Royal Commission on the Future of the Toronto Waterfront (RCFTW), with respect to the port industrial lands, one of the components of this analytical investigation must deal with "waste", and the management of this waste. This sub-model will examine the general concept of waste, what it is, it's flow in the ecosystem, and more specifically the impact of waste and waste management on the goals and objectives for the port industrial lands.

Definition of Waste

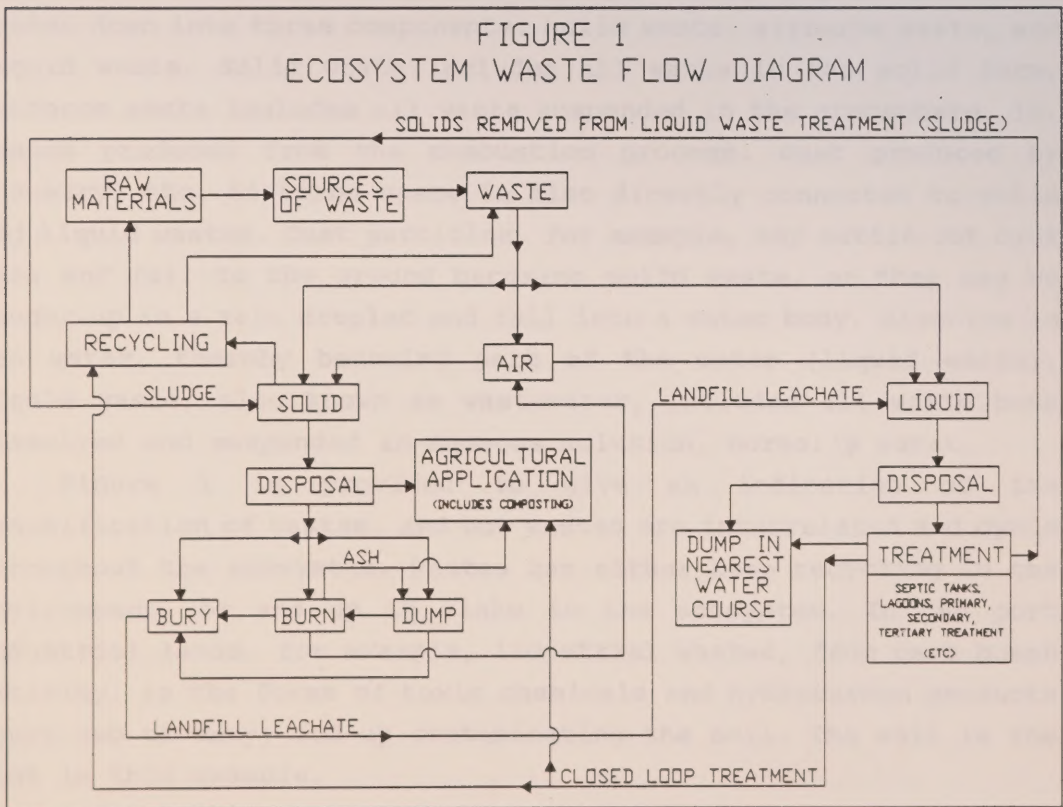
The term waste for the purposes of this sub-model, is to be defined as something rejected for being worthless or unneeded. This definition can be used to categorize a number of components found in the ecosystem. Generally, all biologically processes produce waste. In addition to the waste created by normal biological processes (respiration, food assimilation, etc.), human activity produces numerous amounts of additional waste. Industries consume raw materials to produce products. However, in product production, all of the raw materials are not used, and these remaining raw materials are discarded as waste. For example, in producing a pair of leather shoes, initially an animal must be killed for it's skin. As all of the skin cannot be used, because only certain parts provide long enough lengths of leather to complete the manufacturing process, the remaining shorter pieces of leather must be discarded. In providing electrical power to run industries, some sort of fossil fuel is required. This fuel is burned, however since technology has not yet mastered the process of complete combustion, additional products besides water and carbon dioxide result, ie.

particulates, carbon monoxide, nitrous oxides, etc. Virtually, every process man is engaged in produces some unusable product (waste).

Waste in the Ecosystem

As briefly indicated above, waste is not only produced by biological activity, but by human activity. In the port industrial area, it is the human activity which produces the largest component of waste, and thus it becomes essential to focus in on human activity.

Human activity is primarily concerned with constructing and controlling the environment. Human activity will utilize some sort of raw material to produce a desired product to fulfill this goal.



In the production of this desired product, the generation of waste is inevitable. As waste will always be produced, it becomes essential to classify the flow of this waste in the ecosystem. Figure 1 provides an ecosystem waste flow diagram.

Looking at Figure 1, we see a fairly traditional flow model of waste in the ecosystem, with the incorporation of some modern improvement concepts for minimizing the amounts of waste (recycling, closed loop wastewater treatment - reusing treated wastewater as potable water, etc.).

As shown by figure 1, waste is produced from raw materials, and comes from many sources. For the purposes of the port industrial lands, the primary waste source will be considered as human activity. All aspects of human activity (industry, transportation, housing, recreation, commerce, food consumption, etc.) produce waste. This waste, as shown by Figure 1, can be broken down into three components: solid waste, airborne waste, and liquid waste. Solid waste includes all waste in the solid form. Airborne waste includes all waste suspended in the atmosphere, ie. gasses produced from the combustion process, dust produced by industry, etc. Airborne waste is also directly connected to solid and liquid wastes. Dust particles, for example, may settle out over time and fall to the ground becoming solid waste, or they may be caught up in a rain droplet and fall into a water body, dissolve in the water, thereby becoming part of the water (liquid waste). Liquid waste, also known as wastewater, includes all waste both dissolved and suspended in aqueous solution, normally water.

Figure 1 is provided to give an indication of the classification of wastes, and how wastes are interrelated and cycle throughout the ecosystem. Wastes can either keep recycling in the environment, or end up in sinks in the ecosystem. In the port industrial lands, for example, industrial wastes, from past human activity, in the forms of toxic chemicals and hydrocarbon products (just two of many) end up contaminating the soil. The soil is the sink in this example.

Understanding how waste flows in the ecosystem, allows one to

assess the impact of waste with respect to the thirteen goals and/or objectives for the port industrial lands. Refer to section 3.0 of the main report for more details on the thirteen goals and objectives.

Waste and the Thirteen Goals and/or Objectives

Of the thirteen goals and/or objectives, only three apply directly to waste: clean, green, and foster environmental awareness.

1. **Clean.** To fulfill this goal, the quantity of waste entering the ecosystem must be reduced. As waste is a primary source of contamination for air, land, sediments, and water, the less waste present, the cleaner the environment. Currently airborne waste is controlled by emission requirements under provincial legislation, such as the Environmental Protection Act. Such legislation provides allowable emission levels for certain air emission components (sulfur dioxide, carbon monoxide, total suspended particulates, etc.). The current definition of clean for waste air, is that it meets certain set levels of given contaminants. Similarly, liquid waste is also governed by legislation, as to the content of certain contaminants that can be released into the ecosystem (water bodies in this case). If liquid waste (wastewater) meets the defined legislative levels, it is considered clean. Solid waste is not governed by levels of certain components of the waste, but by disposal methods. If the waste can be disposed of adequately, so that it does not effect immediate environmental and human concerns, it is considered as clean, ie. the out of sight, out of mind concept. However, there are guidelines to the design of landfill containment, leachate disposal, incinerator ash disposal, etc.

To fulfill the clean goal, waste must meet current set standards or levels. These standards and levels are enforced in Ontario by the Ontario Ministry of the Environment (MOE) through the legislative authority of the Environmental Protection Act. The

MOE works with waste producers to define set standards of allowable emission levels for waste (pollutants) using the MOE abatement section. For example, the abatement section will define exact emission levels for the quality and quantity of waste air and wastewater discharges, and issue a certificate of approval (C of A) for those levels. If the levels are exceeded, the MOE's enforcement branch will charge the offender. Usually the offender is fined, although a jail sentence for severe infraction of the Environmental Protection Act is possible.

Every industry or waste producer deals with the MOE's abatement section individually using the certificate approach. Certificates of approval are given with similar guidelines and levels for similar industries or waste producers. To fulfill the clean goal it is assumed that all of the industries in the port industrial area will be operating within their C of A.

2. **Green.** The concept of green requires that natural ecological processes be maintained. To fulfill the green goal, any waste deposited into the ecosystem must be able to be assimilated into this system without causing detrimental harm.

Hazardous wastes which cannot be assimilated, or wastes that take too long to be assimilated, and thus interfere with human activities, must not be allowed into the ecosystem.

Green can be practiced by waste management strategies which include proper waste segregation, and technological advances that allow for the proper treatment of hazardous wastes. Waste segregation of paper, aluminum cans, glass, etc., can form the basis of recycling projects, which will ultimately reduce the quantity of waste, as some waste can be reused. Similarly, plant organic matter, such as vegetable scraps, grass clippings, leaves, etc., can be composted, thereby producing humus which can be mixed with soil to increase soil productivity.

3. **Foster Environmental Awareness.** Waste, waste management, and waste treatment technologies should be explained to the average

citizen. If the average citizen realizes the amount of waste they produce, and the effect of this waste on their environment, it may be possible to reduce wastes, by educating the public to proper recycling methods (blue box, home composting, etc.). Water conservation by the public will reduce wastewater quantities.

Requirements from other sub-model disciplines

If the clean and green goals are to be fulfilled, information from the toxicology/health, soils, water quality, and air quality is needed. By understanding the effect of waste on water quality, soils, air quality, and health, a definition of the quality and quantity of waste that can put in the environment, without damaging it, can be determined. If the wastes are assimilated into this environment, without any detrimental side effects, the green goal has been accomplished.

From an understanding of the impact of waste on terrestrial ecology, aquatics, recreation, etc., certain tolerable levels of waste can be determined. If, for example, a sewage treatment plant is not practicing chlorine disinfection of final effluent, because studies have shown that aquatic organisms are harmed by the resulting trihalomethanes produced, the coliform count entering the receiving waters will be in the tens of thousands. This high coliform count will then make recreational swimming in the receiving waters impossible, because swimmers would be susceptible to waterborne diseases. To meet the needs of aquatic ecology and recreation, current Ministry of the Environment regulations require that disinfection be practiced, and that a certain chlorine residual be allowed to enter the receiving waters. If, ultraviolet disinfection is practiced, instead of chlorination, it appears that the needs of both groups are met. However, economically chlorination is the preferred alternative over ultraviolet, due to the capital and operational cost savings.

What this sewage treatment plant disinfection example shows, is that the waste sub-model is highly related to many other

disciplines. Agreements with other disciplines as to what a waste is, and how much of a waste is tolerable, must be made. Once these decisions are made, the interaction with factors such as economics and politics must be determined to ensure that these decisions can in fact be enforced.

The use of the goals-achievement matrix (GAM)

As discussed in section 3.0 of the main report, there are thirteen goals and/or objectives for future development in the port industrial lands. Each of these goals can be given a value weight, and then using the methodology of the GAM, a rational decision can be made. Within the waste sub-model, the following measuring units or indicators are recommended for operationalizing the GAM for waste:

1. **Clean.** There are three classifications of waste: air, solid, and liquid.

AIR: measured by total suspended particulates (TSP) in micrograms per cubic meter, sulfur dioxide (SO_2) in parts per million by volume (ppm), carbon monoxide (CO) in ppm, nitrogen dioxide (NO_2), photochemical oxidants (PCOs) in ppm, and non-methane hydrocarbons (HC) in ppm.

LIQUID: measured by five day biological oxygen demand (BOD_5) in milligrams per liter (mg/L), total suspended solids (TSS) in mg/L, and phosphorous (P) in (mg/L).

SOLID: measured in metric tons.

2. **Green.** Measured by the presence of waste reducing technologies; ie. the recycle loops of figure 1 (composting, solid waste recycling, wastewater reuse), and waste cleanup or remedial projects (for example soil rehabilitation).

3. **Foster Environmental Awareness.** Measured by the presence of educational program(s) that are intended to increase public awareness of waste management techniques.

Methodology for evaluating the proposals for Toronto's waterfront.

The THC and RCFTW, both have separate proposals for the future of Toronto's waterfront. To assess these proposals, the GAM approach using the 13 goals and/or objectives is recommended. The one with the highest score will be the best solution. Refer to section 5.0 for the evaluation.

In evaluating the THC and RCFTW proposals specifically for waste, the indicators discussed earlier were used, and assigned a value from -3 to +3, where "0" indicates no change, "+3" indicates positive change toward goal, and "-3" indicates negative change away from goal. A summary of these indicators and assigned values appears below. Note that the abbreviations, ie. TSP = total suspended particulates, are defined earlier in this paper.

<u>Indicator</u>	<u>RCFTW</u>	<u>THC</u>
CLEAN		
Air -- TSS	+1	0
-- SO ₂	0	0
-- CO	0	0
-- NO ₂	0	0
-- PCOs	0	0
-- HC	0	0
	-----	-----
TOTAL:	+1	0

With an increase in parkland and a move to green industries, under the RCFTW proposal, suspended particulates (dust, etc.) would tend to decrease. No change is foreseen in the other indicators as they are not only influenced by local sources but by many sources within the Greater Toronto Area (automobiles, hospital incinerators, construction, etc.).

<u>Indicator</u>	<u>RCFTW</u>	<u>THC</u>
CLEAN		
Water -- BOD ₅	+1	0
-- TSS	+1	0
-- P	+1	0
	-----	-----
TOTAL:	+3	0

With the overall concern of watersheds and water quality (cleaning up the Don River for example) emphasized by the RCFTW, the RCFTW proposal is seen as a move towards more stringent wastewater effluent discharge criteria in the future, and thus a value of "1": is given across the board for the RCFTW.

<u>Indicator</u>	<u>RCFTW</u>	<u>THC</u>
CLEAN		
Solid -- Quantity	+1	0
	-----	-----
TOTAL:	+1	0

The RCFTW proposal for parkland and green industry, as well as their emphasis on innovative waste technologies for reducing the quantity of wastes produced, results in a "+1" value being assigned.

<u>Indicator</u>	<u>RCFTW</u>	<u>THC</u>
GREEN		
Waste reducing technologies	+2	0
Waste cleanup/remedial action	+1	+3
	-----	-----
TOTAL:	+3	+3

As waste reducing technologies (recycling, water conservation) are mentioned in the RCFTW proposal, and no mention is given to these in the THC proposal, the "+2" value was assigned. As both the THC and RCFTW mention soil rehabilitation in their proposals, positive values for waste cleanup/remedial actions were given. A "+3" was given to the THC, as they have undertaken detailed

research into the requirements and costs of soil remedial action, whereas the RCFTW only states that rehabilitation is required.

<u>Indicator</u>	<u>RCFTW</u>	<u>THC</u>
FOSTER ENVIRONMENTAL AWARENESS		
Attempts to increase public awareness about environment and the impact of waste on the environment	+2	0
	-----	-----
TOTAL:	+2	+0

As the RCFTW published a report entitled WATERSHED in August (1990), geared to promoting not only their proposal to the politicians, but to provide a public information document, a "+2" was assigned. It was felt by the author, that this report contained educational information for the average member of the public, concerning the ecosystem approach to environmental study, and the concept that waste is part of the detrimental impact of human activity on the environment.

A summary of the total values for each indicator is given below.

<u>Goal</u>	<u>RCFTW</u>	<u>THC</u>
CLEAN (sum of air, water, & solid)	+5	0
GREEN	+3	+3
FOSTER ENVIRONMENTAL AWARENESS	+2	0
	-----	-----
TOTAL:	+10	+3

As RCFTW (+10) > THC (+3), it is concluded that the RCFTW proposal is preferred over the THC proposal for waste.

Furthermore, with respect to land use, the RCFTW land use allocation for the port industrial area appears to be the best solution for waste, as there is an emphasis on parkland, and light industrial use, as compared to the more heavy industrial land use foreseen by the THC. The THC wants to maintain the current heavy industrial ownership in the area. Parkland provides a more easily

controlled waste management system, compared to industrial land use. With industrial use there are the concerns of hazardous waste treatment, costly handling of waste, special legislation to adhere to (ie. sewer-use bylaws, air pollution emission criteria, etc).

Conclusions

Figure 1 provides an ecosystem waste flow diagram, useful for classifying the type and state of waste within the port industrial area.

The definition of waste is complex, and varies with the criteria used to define the quantity and quality of wastes. A number of disciplines are required to cooperate in defining what a waste is, and what levels of waste are acceptable.

The goals-achievement matrix approach (GAM) is recommended for assessing the proposals of the THC and RCFTW, for the future of the Toronto waterfront, with respect to waste.

Waste is only a sub-component of the big picture in evaluating proposals for the future of Toronto's waterfront, and as such, even if the waste component benefits are preferred in a selection of a proposal (in this case the RCFTW), it must be remembered that there are many other factors to consider. The waste sub-component is just another factor in a larger picture containing an infinite number of other factors. For a more complete evaluation of the two proposals refer to section 5.0 of the main report.

Health

Helen Walters

This report will attempt to look at the potential health impacts of two East Bayfront/Port Industrial Area development plans: The Toronto Harbour Commission 1990 Concept Plan and the Royal Commission's Watershed Report. Potential impacts on human health will be considered in relation to those of the thirteen goals or objectives identified which can be related to health considerations.

For purposes of clarity, this report will be divided into four sections. First, the goals related to human health will be identified with possible indicators for measurement. Second, a method of environmental health impact assessment will be considered. Third, the two plans will be discussed specifically in relation to health impacts. Fourth, some tentative conclusions will be offered.

Goals

The goals of clean, green, useable and accessible relate to health impacts. Each goal is defined and measure as follows:

1. Clean

According to the Royal Commission, clean is interpreted as:

- a. air, land, sediments and water should be contaminant free;
- b. water quality should be fishable, drinkable and swimmable.

Currently, the waterfront, specifically the Port Industrial Area has major contamination problems. These problems include:

- a. air quality: Emissions in the East Bay Front Industrial Area include SOx, NOx, CO, particulates, and volatile organic compounds (Royal Commission, #10, 1990). Although these emissions

represent only a fraction of the total emissions of Metro (Royal Commission, #10, 1990), they may still constitute a potential health hazard. Direct morbidity and mortality linked to emissions is difficult to prove conclusively (Freedman, 1989). However, air polluted by the above-listed chemicals can be linked to respiratory problems in vulnerable populations (the elderly, the young and those with respiratory illnesses). As well repeated occupational exposure to these pollutants may be a health hazard to workers employed in or near these emission sources.

Decreases in respiratory illness in the population can not be linked directly only to decreases in emission levels of current industries in the Port Industrial Area. Air quality must be considered in the larger context and not limited to the small Port Industrial Area. Industries in the Port Industrial Area do contribute to the pollution in Metro and therefore do constitute a potential health hazard.

It is interesting to note that the conclusions of the environmental audit indicated that while SO₂ and NO₂ do not constitute a problem currently in the Port Industrial area, CO, suspended particulate matter and dustfall are a problem (Atmospheric Environment, Technical paper #1). This problem can be a possible health risk.

Emission levels from vehicle exhaust travelling on the Gardner Expressway and on Lakeshore Boulevard must also be considered a risk to human health. Therefore reduction of current emission levels would at least decrease the potential health hazard.

b. Soil and Groundwater: Of the sites studied for Phase 1 of

the Royal Commission's Environmental Audit (12 of 123 sites), all were found to be extensively contaminated by Ministry of the Environment Standards. Included in this list of contaminants were heavy metals (such as lead, cadmium, mercury, as well as PAHs and high levels of oil and grease. The groundwater was also found to be severely polluted by oil and grease, phenols, heavy metals and volatile hydrocarbons (Royal Commission, #10, 1990). All the heavy metals listed have been shown to be directly hazardous to human health (Freedman, 1989). The levels of these contaminants would therefore have to be substantially reduced, if not eliminated in order to meet the "clean" objective.

c. Water Quality: As noted by the Royal Commission, there are many pollutants on the waterfront whose sources are both outside the waterfront; stormwater runoff, dryweather seepage, combined sewer overflows, sewage treatment plant effluents, sediments, and atmospheric deposition. Measures of water quality include

1. Eutrophication; the open waters of Lake Ontario are in a mesotrophic category. There have been improvements since 1969 with the reduction of phosphorous loadings into the Lake.

2. Bacterial concentration; specifically fecal coliform levels are often unacceptably high necessitating closing of the beaches (Royal Commission #1, 1989).

3. Clarity; levels of turbidity are often higher than acceptable standards especially during rainfalls.

4. Heavy Metals; According to the Royal Commission, the Keating Channel frequently contains concentrations of copper, iron, lead and zinc that exceed safe levels. In terms of organic

contaminants, the Royal Commission note that while there have been few studies in this area using poor sampling techniques, one 1983 study indicated high concentrations of PCBs in Don River effluents and in the Inner Harbour. Considering that PCBs persist in the environment, it is likely that this contaminant still poses a serious health hazard and that remediation would be necessary before development.

Sediment contamination is also currently an environmental problem. The Royal Commission noted that in all the areas studied for the environmental audit, the levels for at least six pollutants exceeded the open water dispersal guidelines. These contaminants can impact on aquatic vegetation, fish eating birds, and animals thus travelling through food webs, possibly affecting humans.

The Royal Commission concluded that water quality was generally poor.

Given that the current status of the Port Industrial Area is indeed polluted, any development plan that plans for clean up before development is likely to impact environmental quality in a positive way. Indicators demonstrating achievement of the "clean" objective related to health are as follows:

1. Air: substantial reduction in the amount of emissions and effluents from the factories in the Port Area. This could either be accomplished through closing down these industries or by utilization of pollution control technology to reduce and/or eliminate emissions. In addition substantial reduction of vehicle emissions would also be necessary to achieve the clean goal.

2. Soil: Soil and groundwater clean up would involve

substantial reduction of the amount of heavy metal contamination especially if the land is to be used for recreational/parkland purposes.

3. Water" Substantial reduction in contaminants entering the lake from all sources. This is outlined in the waste management section.

2. Green

The green goal can also relate to health impacts. Rather than be limited to human health, the Green objective can also be used towards overall improvement of ecosystem health. Indicators for achievement of this objective are broader than health concerns and have been identified in the abiotic and biotic sub-sections of the group report. However, it can be assumed that improving green spaces and parkland would have a positive impact on human well being.

3. Useable:

Useable is another goal that relates directly to health issues. The Port Industrial areas must be useable by all population groups, including the handicapped, the elderly and the young. For example, wheel chair access facilities, including washrooms must be included in development planning. In addition, safety features (adequate lighting, safety railings etc.) must be provided. This particular goal relates to both built heritage and health.

Environmental Health Impact Assessment

An environmental health impact assessment (EHIA) could be conducted to evaluate the impacts of both projects. As pointed out by Martin (1986), health factors are not well addressed in current EA processes. However, and as she suggests, EHIA can be used to enhance the EA process inspite of the limitations inherent in EHIA. These limitations include four major constraints:

1. Because of the complexity of environmental health impacts and the various pathways of exposure, it is difficult to identify direct links between human health and environmental problems. This lack of information was indicated in the 1989 Interim Report of the Royal Commission (Royal Commission, 1989, p. 133).
2. The limits of scientific knowledge is also a potential constraint. Identification of a hazard can be problematic because their are limitations of epidemiological methodology in attempting to establish causal relationships. There are also limits of biological knowledge regarding toxicity and environmental disease processes.
3. Biological variation (different subgroups of population) affect the epidemiological approach to EHIA.
4. There are also resource constraints, both in terms of financial resources and trained professionals.

Martin notes that while EHIA is a preventive approach, it is very difficult to operationalize in practice. The initial phases of the EHIA involve the identification of environmental health factors. These identification processes are similar to and can be incorporated in "screening" and "scoping" processes of EA. This

type of process could be incorporated into a Goals Achievement Matrix (GAM) to EA in which health related goals can be identified by the community. The community could also assign the weights. Measurements of achievement of the goals, however, would be difficult due to the state of the art for EHIA.

Comparison of the Toronto Harbour Commission Plan and the Royal Commission Plan

There is much similarity and overlap between the Toronto Harbour Commission Concept Plan and the Royal Commission's Watershed approach. The Royal Commission Plan is more radical in terms of recommending changes to current land use, while the Toronto Harbour Commission's Plan is a more status quo stewardship approach to development. In addition, the Royal Commission's recommendation include severe curtailment of the Toronto Harbour Commission's activities and responsibilities.

According to the T.H.C. literature, their Port Concept Plan includes the development of a new public marina, an eighty acre park at Cherry Beach, and a sixty acre business park and port consolidation. The T.H.C. are currently implementing this plan. Whether or not environmental issues were considered and how they were considered is not described in any of their literature. In his presentation to the Environmental Impact Assessment Class, The T.H.C. spokesman, Tim Conway indicated that plans to clean up the contaminated water front soil were being considered and technology to achieve this was currently being developed.

The Royal Commission recommends that the T.H.C. be virtually stripped of all its development responsibilities, leaving their mandate to shipping and Port related responsibilities, and for the time being, they recommend that the T.H.C. continue to administer the Toronto Island Airport. All the T.H.C. activities are to be centralized at the western end of the Port Industrial Area. The Royal Commission development plan includes an extension of the Cherry Beach Park to two hundred acres, a new waterfront Industrial Park (which would have only light or non-smokestack industry) and an area to be conveyed to TEDCO for development and research into green industry. TEDCO, with the creation of a Centre for Green Enterprise would stimulate and attract environmentally-friendly enterprises. No discussion is offered about the current industrial tenants of the East Bayfront Area.

In terms of achievement of identified goals, overall, it seems that the Royal Commission's plan, in attempting an ecosystem approach and with its constant references to cleaning up the environment, has more potential for environmental improvement. For health related goals, the Royal Commission's approach is likely to come closer to meeting the clean, green, useable and accessible objectives. It is impossible (given the information available and the current state of the art of health impact assessment) to measure with any degree of accuracy whether human health would be significantly impacted (in either a positive or negative fashion) with either plan. However, since the Royal Commission's approach to the waterfront is not limited to the Port Industrial Area, but includes the larger region and also does attempt to think in

ecosystem terms, it is more likely to come closer to meeting the goals and objectives.

Tentative Conclusions

Human health concerns should be a priority issue for any development plans for the Port Industrial Area. Clean up of the environment including decommissioning of the soil and cleaning up the water system are essential in order that health impacts be addressed before redevelopment.

In terms of which plan comes closer to approximating a sustainable development approach to development in the Port Industrial Area, the Watershed Plan seems to have less adverse potential health risks than the T.H.C. Concept Plan.

References Cited

Freedman, Bill. 1989. Environmental Ecology. Academic Press, San Diego.

Martin, Julie E. 1986. "Environmental Health Impact Assessment: Methods and Sources," Environmental Impactt Assessment Review, 6, pp. 7-48.

MacAllister, Environmental Planning, Gam section.

The Royal Commission on the Future of the Waterfront. 1989, Interim Report.

- 1989. Environment and Health. #1.
- 1990. Watershed.
- 1990. Environment in Transition. #10.

Shenfeld, Lou. 1990. Atmospheric Environment. Environmental Audit of the East Bayfront/Port Industrial Area.

Built Heritage

Frank Dieterman

SUB-MODEL REPORT: BUILT HERITAGE

Built heritage, or environment, implies a sense of place. The place may incorporate aspects of built heritage that are historically, architecturally, and culturally of significance, and may relate to buildings, districts, landscapes, and views. The Royal Commission on the Future of the Toronto Waterfront Report No.4: Parks, Pleasures, and Public Amenities (1989: 83-85) notes that the historical continuity of the area be maintained and reinforced through the incorporation of the Toronto Historical Board's assessment of the Toronto Harbour Commission (THC) lands. Culturally significant districts must be preserved including the working portlands and the related unobstructed views back to the city. In addition, sensitive adaptive reuse of historically and architecturally significant buildings should be a major part of any waterfront development plans. Heritage includes marine and industrial heritage and historic patterns of development. Currently, there is one identified heritage building in the Port Industrial Area (PIA); the 1920 former Bank of Montreal at 309 Cherry Street (listed in the City of Toronto's Inventory of Heritage Properties).

Proposals

The THC proposal is to maintain the PIA as it is with enhanced ability to function as a port through restructuring and reinforcing port activities, retaining all land within the jurisdiction of the THC. In short, the Port Concept Plan calls for a new marina (under construction), expand Cherry Beach park to 80 acres and a 60 acre business park south of the ship channel along Commissioner Street. The identified goals for the project are: enhanced port use; economic development; attract tourism; and status quo ownership.

The Royal Commission's proposal involves reducing the THC role and physical control to an area adjacent and north of the ship channel. The remainder of the PIA will consist of a 200 acre park at Cherry Beach, a new waterfront industrial park (eastern sector of PIA),

and a regeneration land trust for new development (industrial and other; western sector of PIA). the identified goals for the Royal Commission are: clean; green; usable; diverse; open; foster environmental awareness; connected; affordable; attractive.

Built Heritage Model

A common starting ground for the PIA built heritage involves the concept of significance. The initial concern should be representative of large scale preservation. A district can be identified as a physical block of buildings, a common usage (factories), a common architectural style, common construction dates, or any other unifying force that can be attributed to a cluster of buildings and/or areas. I believe that all appraisals of built heritage should start from this basic premise. The model (see diagram) clearly indicates the methodology to carry one beyond this initial process. If a single structure stands out as distinct and cannot be attributed to any grouping, as often is the case, there is the recognition of this in the model and the ability to assess single structures.

The model necessitates that one begin with district significance, using built heritage goals, and assess the district according to the goals. If no district significance is present, the alternatives are to maintain the area as is, or demolish/restructure the area for new development. If the area is deemed significant, then remediation (if necessary) and adaptive reuse and/or heritage designation can occur. In the example of an individual building, a decision is made whether the building has historical and/or architectural value, or no heritage value. The model then determines if the building is to be maintained (facade or built form), and to what extent (completely, partially [facade], or not reused [no significance]) preserved as a built heritage structure. The model provides a quick, simple method of determining whether a district has elements of heritage value and what steps can be taken to preserve those values deemed important.

Goals and Measurement Techniques

Assessing the two proposed plans for the PIA, the Royal Commission and the THC's Port Concept Plan, the goals that are of greatest significance must be addressed. Of the nine objectives identified by the Royal Commission, clean (free of contaminants), usable (environmentally friendly in function and form), and connected (preserve historic buildings, patterns of development) can be of principle concern to any aspect of heritage built form. THC goals of relevance are economic development (historic built forms with sensitive adaptive reuse) and attracting tourism (heritage sites). These goals or objectives would be used in the Goals Achievement Matrix (GAM) to determine goal progression or regression measurements.

Free of contaminants will depend on initial contamination of buildings (asbestos, soils, water) and the effects remediation will have on the building and surrounding property. Scientific sampling techniques will determine if significant results in lowering contamination levels (ie pollutants/ppm) have been achieved.

Environmentally friendly in function and form is a end-result measurement and may be difficult to reverse if not appropriate. Methods of determining this criterion would be to check for energy saving techniques in built form, such as proper design to prevent wind tunnels, safe and well designed forms for women and disabled people, and function, such as solar panels for passive heating, water saving devices, proper insulation etc. These measuring tactics are necessary at the architectural planning stage and must be made clear from the outset what is deemed proper. Success could be measured through units of energy saved.

The preservation of buildings and patterns of development will involve a survey of existing built forms and a mapping of definite and potential heritage buildings and patterns of development. This would be measured by adherence to a PIA heritage plan, in association with other development and recreation plans.

Sensitive adaptive reuse would be identified through a combination of the above two criteria. Appropriate built forms would be identified as heritage status (preservation of buildings), and deemed appropriate uses would be considered for these buildings if reuse was an option, and adaptive reuse would be administered at the same time as environmentally friendly function and form were identified and emphasized in the architectural planning stage. Measurement of this criterion would be incorporated into the previous objective.

Potential tourist attraction is a difficult principle to determine at this time. Plans for the area must be included in this criterion, including any museums, heritage buildings and districts, and the PIA's potential to attract tourism as a result of the two concept proposals. Measuring tourism is simple; using gate receipts as an indicator of tourist traffic for a given site at a given time. The built heritage goal of attracting tourists could be more difficult to measure if the heritage site is the entire area, or a district. A method of determining traffic flow could be one example of a tourism indicator. However, any tourism measurements would be far in the future, and of a removed significance from the immediate concern for preservation of built heritage in the PIA.

The GAM rankings for the five heritage objectives are as follows:

	THC	RC
Free of Contaminants	2	1
Environmentally Friendly	0	1
Preservation	1	2
Sensitive Adaptive Reuse	0	0
Tourism	1	2

Predicted Impact: Affect on Built Heritage

Physically, the PIA will remain relatively untouched in the THC proposal. However, the proposed business park south of the ship channel is where the majority of the built forms are located. This would result in a large portion of the present structures to be threatened by the redevelopment plan. The THC proposal does not call for any official recognition of heritage properties or the identification of heritage districts. While the THC's proposal appears to be less radical and controversial of the two plans, the end result for built heritage is more threatened under the THC than the Royal Commission, given that the THC's identified goals are more of an economic and PIA functioning focus and not concerned with the heritage aspects of the PIA. Therefore, the predicted changes are in line with the criteria of the THC, but are not in line with the criteria of built heritage preservation.

The Royal Commission proposal calls for greater disturbance of the built environment of the PIA. The proposed plan denotes new development throughout the PIA, concentrating on the areas south of the ship channel. As with the THC proposal, the built form of the area will be threatened by redevelopment of the area. Built heritage is a key factor in determining which areas/structures will be preserved, reused, or demolished. The identified goals of the Royal Commission are in keeping with the previously mentioned five heritage principles.

From this, the Royal Commission's proposal would benefit the built heritage aspect of the PIA more so than the THC proposal. It is ironic that the Royal Commission proposal calls for an almost complete restructuring of the economic activities of the PIA, yet the methodology proposed for this development would potentially ensure the preservation of heritage buildings and districts.

The non-monetary benefit of the retention of built heritage would be the preservation of a historically significant part of the City

of Toronto's portlands. An important aspect to keep in mind is the proposed heritage goals of the Royal Commission and the actual results of the PIA with regards to heritage structures and districts. This may represent a very different scenario upon implementation of the Royal Commission's recommendations if the proposal is adopted. A strong lobby may be necessary to ensure a heritage component for the PIA.

Economics

Kerry Hayward

**Economic Perspective on the Waterfront:
Proposals for Development**

by
Kerry Hayward
Student Number 882192500

Table of Contents

BACKGROUND

Previous Land Uses.....pp. 1

Baseline Economic Conditions.....pp. 3

COMPARISON OF THE MAJOR PROPOSALS

Royal Commission on
the Future of the Toronto
Waterfront.....pp. 6

Toronto Harbour Commission's
Concept Plan.....pp. 10

EVALUATION

Methodology.....pp. 12

Ranking of Criteria.....pp. 13

CONCLUSION

Caveats.....pp. 18

APPENDICES

Figures 1-4

Maps 1-4

Tables 1-2

ECONOMIC PERSPECTIVE ON FUTURE DEVELOPMENT OF THE WATERFRONT

Background

Previous Land Uses

Economic activity in the Port Industrial and East Bayfront areas can be traced back to 1912 with the evolution of the Toronto Harbour Commission, a public body mandated with port development. Their creation occurred in a background of growing public indecision surrounding major problems facing the Port, namely poor navigation ability, polluted waters, and lack of access.

The shipping difficulties stemmed from the Don River's alluvial disgorings, creating a need for expensive dredging to maintain the Harbour at a depth adequate for navigation. In general, however, successive breakwaters engineered proved unable to withstand spring flooding. They were also a major contributing factor to the Waterfront's pollution problems, through the physical separation of Ashbridge's Bay from the Harbour. Though the breakwaters were successful in reducing silt deposition in the Harbour through diversion, they also acted to limit water circulation. This cumulated in a major health hazard, since the marshlands were already being polluted by city sewers at a rate of over 12 tonnes of sewage a day, and by discharge from cattle byres, housing over 4000 cattle. By 1892, the provincial Board of Health ordered the city to take measures to reduce the health hazards posed by the "malarial swamp...teeming with pestilence and disease."¹ A corrective plan formulated by a city engineer, Keating, which included drainage, reclamation and diversion of the Don, was stalled due to concerns over access and riparian rights. Thus, the growing health risks concomitant with inaction led to a

campaign to establish a public harbour body, the Toronto Harbour Commission.

Aside from environmental and health concerns, the inception of the Toronto Harbour Commission (THC) can also be traced back to the belief that a new institutional arrangement to manage the port would overcome systematic economic changes and major access barriers, limiting port use. The shift in Toronto's economy from resource-based to industrial-based was also mirrored in transportation needs; and while the railways were competitive to respond to these adjustments, harbour development was either non-existent or too slow. Eight sets of railway tracks also physically obstructed access, diminishing the Port's desirability.

Within eight months of its creation, the THC formulated a comprehensive plan which included the creation of retaining walls, a 122 ft wide shipping channel and turning basin; the reconfiguration of the Don River, creating a 90 degree turn into Keating channel; and lakefilling of Ashbridge's Bay. In fact most of the Port area in question was created by lakefill coupled with sewage sludge, construction rubble, and municipal refuse. The waterfront became the City's convenient dumping ground, and in this way significantly contributed to the legacy of current environmental problems.

Initial concerns over the externality effects caused by the proposed location of heavy industry in the area were preempted in the 1920-1930 era due to the perceived need to cultivate jobs and economic growth.² By 1931 40 industries had followed British

Forgings Limited into the Port Industrial District, attracted by the proximity of the port and railway terminal, and by the availability of land on a large scale. These industries included oil refineries and tank storage farms, coal yards, tar distillation plants, tanneries, lumber yards and metal foundries.³ The history of heavy industry thus laid a framework for development of the East Bayfront area and expansion of the Port Industrial Area, consistent with expectations of increased shipping from the opening of the St. Lawrence Seaway.

The anticipated increase in the importance of the Port never materialized, however, and tonnage handled has continually decreased to the present day.⁴ This is primarily a result of the trend towards containerization of shipments, implying preference of the railway over shipping. The Port of Toronto has thus evolved into a regional port, serving the 12 port-dependent industries located in its proximity, and ranked only sixteenth nationally in terms of tonnage. Major commodities handled include general cargo, cement, aggregates, salt, liquid bulk, sugar and grain.

Baseline Conditions of the Port Industrial and East Bayfront Areas

The Port Area has through its history been almost exclusively associated with heavy industry. Such a bequest has been furthered by the City of Toronto. Its heavy industry policy acts to limit the proliferation of heavy industries throughout the planning district, confining such uses to the 435 hectare Port Industrial Area. In fact, the City has actively encouraged the relocation of compatible industry to the area, most notable of these being scrap

metal recyclers. Current zoning bylaws implement this policy by limiting densities and lot coverage to those associated with industrial requirements. The Port Area, now contains over 40 percent of industry found in the City of Toronto, and is thus extremely important both in terms of planning and for regional economic growth.

Such policies, providing the Waterfront with an integral role in the creation of income, jobs and a taxbase, is seriously threatened, however, with the recent economic trend away from heavy industry. This is clearly illustrated in Figure 2 which shows that during the 1980s the industrial sector declined from providing 40 percent of the total employment base to only 28 percent, losing over 8 000 jobs in the process. This move towards lighter industry and the tertiary sector (including information processing and financial services) is also pronounced in the Metro region as a whole: office work and services combined increased from 53% in 1983 to 59%.⁵

Economic growth in the Greater Toronto Area, including the Waterfront, has been highly volatile, following closely national recessions and periods of high growth. Figure 4 indicates that growth ranged from 15% in 1966 to a low of -4.2% in 1982.⁶ The future economic outlook is nevertheless projected to stabilize somewhat to the year 2011, with annual growth for the region remaining above 2%.⁷ However, it is felt that future baseline growth projections for the Waterfront will not be as promising due primarily to the deemphasizing of industry, as indicated above.

Further, constraints to growth are also imposed by the inherent nature of heavy industry, considered a low value-added economic activity, as well as being land intensive vis-a-vis employment. Overall, annual economic growth for the Port area is projected to be constrained to a maximum 2 percent over the long term, and employment growth below 0.5% annually. This is despite the fact that much of the lands in the Port Industrial and East Bayfront Areas lie seriously underutilized.

Comparison of the Major Development Proposals for the Area

In light of the diminishing economic role being played by the Waterfront area, it is fair to say that all governmental levels involved have recognized the necessity of maintaining industry on the Waterfront, and the role that it plays in the region's economy. There also seems to be a general consensus on the need to attract second-generation industry in order to secure the highest growth potential for the area. Such light industry, characterized as non-emitting, and by high unit-values, focuses on high technology and computer applications, as well as on communications.

The major divergences in the proposed plans relate, however, to several pertinent issues: (1) environmental enhancement of the area, most notably soil remediation on the lands occupied by heavy industry; (2) the amount of lands to be advanced for industrial purposes; (3) the type and mix of industry appropriate for the area (4) the appropriate development agency to be mandated with securing future growth for the area, and; (5) the future importance of the Port and the subsequent increase of sufficient infrastructure;

The Proposal set forth by The Royal Commission on the Future of the Toronto Waterfront

It must be stressed at this point that the Watershed proposal is a concept plan, primarily formulated for discussion purposes. As such, many of the key ideas formulated do not address questions of implementability. Evaluation of such a plan against others laid out more concretely, has thus tended to preoccupy this work group with overcoming this perceived problem. At this juncture, it was deemed most pertinent to evaluate the proposals at face value, recognizing that our work is also preliminary. This is not to say that we feel that it is outside our scope to criticize ideas that we feel are unworkable, but rather a simple recognition of the fundamental differences existing between the strategies.

The Royal Commission on the Future of the Toronto Waterfront, as its name suggests, has been instructed to make recommendations regarding the most optimal ways to utilize the Waterfront in accordance with goals emanating from public input: clean, green, useable, diverse, open, accessible, connected, affordable and attractive.⁸ Following a two year period, including completion of an extensive environmental inventory of the area, workshop and committee research, and public hearings, the Watershed interim report was released under the auspices that it represented what the people wanted for the future development of the Waterfront.

One of the most noticeable features of the Report is the continued concentration of Waterfront industry in the Port Industrial District and East Bayfront, reinforcing trends of deindustrialization of the Etobicoke and Scarborough waterfronts.

Land uses proposed for discussion purposes, and reproduced in Map 3, further highlight two main transformations. They include creation of areas reserved for soil remediation to be followed by mixed land use developments, and the creation of a green industrial park.

The suggested Toronto Waterfront Regeneration Land Trust, encompasses the E.L. Cousins Dock, and land directly to the north, extending as far south as the Ship Channel, and as far east as the Don Roadway. Following remediation of the area, the land, to be retained in public domain forever, will be "converted to productive lands that would create opportunities for thousands to live, work and play [here]." ⁹ The obvious implication from this statement is the commitment towards (affordable) housing, and mixed land uses, also including retail and commercial activities. This perhaps explains why this area was targeted for remediation, even though it is not recognized to be the most pressing area for clean up. Of further economic concern are certain ambiguities aside from major questions on who will pay, and what the time line involved will be. The document states that the such a Trust should incorporate THC land and wholly owned provincial lands. However, the discussion map is clearly contiguous, including privately owned land. Under such proposals various users will be either relocated or be prevented from operating. It is believed, however, that the latter course of action is likely considering that the rest of the proposed plan is geared towards light industry and recreational uses. ¹⁰

The land to the North east of the Don Roadway and Ship Channel is targeted by the Royal Commission as the area to support continued industrial growth. Their major proposition sets out to empower the Toronto Economic Development Corporation, not only with attracting green industry to the area, but also with fostering economic growth. Attributes of environmentally sound industries include those who have a balanced resource use, maximizing recycling and/or developing technology to facilitate recycling; those who have zero emissions; those which are "socially valued"; those which do not endanger workers' health; and those which are produce efficiently.¹¹ The sector is extremely buoyant, considering the gradual greening of the public's values. There are currently more than 3 000 companies in Canada which offer environmental products and services, generating more than \$7 billion annually. This type of industry is thus considered suitable for the area, and consistent with Watershed's general aims.

The Royal Commission has, however, no firm policy on the status of current heavy industry in the area. Verbally, it is has been stated that they would be permitted to stay if they meet stringent environmental abatement conditions. The ambiguity in this is that the resulting uncertainty will limit business investment in the area. In addition approximately half of the land is privately owned, and the leased land is physically separated, limiting, at best, the ability to create a central location for green industry, to be serviced by an R&D Centre for Green

Enterprise. The uncertainty is anticipated to be detrimental to TEDCO's ability to carry out its mandate to provide a home for environment-related industrial research and development, as well as to the industries currently located there.

Citing the recent decline in port activity, coupled with the nature of future use, limiting heavy industry in the area, land devoted to docks and shipping terminals will be consolidated south of the shipping channel and as far east as Don Roadway.¹² This conceivably frees up MT 35, E.L. Cousins Dock, and improves efficiency in land use. In fact the discussion paper sees only a small role to be played by the Toronto Harbour Commission, constrained to that of providing contractual maintenance services for the marina and terminal activity.

These adjustments will change the face of Toronto's central waterfront. The consolidation of industry into the north-east corner of the planning district will improve land efficiency; and over time high unit-value, low land-intensive industries will replace heavy industry as a major component of growth in the area. The injection of mixed land use in the area, and the ambiguity vis-a-vis the status of heavy industry will be expected, as stated to instill a high degree of uncertainty into waterfront investment and industrial relocation. Speculation in land values may thus increase as a threat to the integrity of the waterfront's industrial role. As such forecast of future economic growth above baseline conditions can only be fraught with error. Nevertheless, it is the opinion of the author that as a result of the suggested

plans for the East Bayfront/Port Industrial areas, GDP growth for the GTA will be below 5% Employment for the Waterfront is projected to increase by approximately 20 000, an increase of 25%. These gains will further be realized predominately in the industrial sector.

The Toronto Harbour Commissioner's Concept Plan

The Concept Plan formulated in 1988, offers three objectives for the area, including (1) the provision of services for current and future needs of port users; (2) increased public access to enjoy the waterfront; (3) the fostering of economic development.¹³ The THC's Concept Plan is designed to be phased in over twenty years, so as to minimize uncertainty, coordinate leases, build business confidence, and maintain flexibility. It places heavy emphasis on the strategy that the Port area should continue as a long-term resource for shipping and industrial operations, and in consequence, housing is regarded to be incompatible with the surrounding land uses.

In a similar vein to the Royal Commission, shipping activity is to be consolidated along the southern portion of the Ship Channel in order to maximize use of the dock wall. However, in addition land to the north of the Channel will be set aside for marine terminal use. This is a substantial increase, representing both an increase in port infrastructure, leading to physical improvements to THC work facilities and docks, as well as concentration of heavy industry along the water's edge.

Map 4 indicates the locations of the four new business and

industrial parks, which according to the THC will be responsive to market demands. Their projections, consistent with present trends and the Royal Commission's own studies, indicate the continued growth of these second-generation industries, in lieu of heavy industry. This is significant as it dramatically increases the revenue generating potential of the area, while at the same time minimizing emittants and waste.

The Concept Plan dedicates approximately 50 % more land to industrial uses, including, most notably, Polson's Quay and E.L. Cousins Dock in transitional uses. Such activities entail market areas, film studios, water dependent activities and light industry. The Plan also indicates its commitment to existing firms in the area by making it clear that the THC will work with them to minimize environmental incompatibilities. For example, parking space and buffer regions will surround Canada Cement Ltd to contain dust and noise. Emissions from the area are then not substantially higher than the base line condition. Sewage and industrial waste will necessarily increase in correlation with the level of industrial activity. Commitment to soil remediation is, however, perceived to be less than that expressed by the Royal Commission. This is due to the fact that the THC will invest only their operating surplus into the activity, while the Royal Commission would conceivably inject public funds. Although the THC intends to develop and market the soil cleaning technology, increasing their revenues, the time frame involved will be considerably longer. This seems not to have been taken into account by the THC.

The Plan as whole could also further economic growth to the GTA by 5-10%, depending on the length of time taken to attract new industrial activity to the area, and its type. It also has the real potential to increase employment in the Waterfront area by 50 000 plus due to the minimization of economic uncertainty, the stabilization of land values, and the commitment to existing industries. Rationalized transportation routes, including realignment of the Don Valley Parkway and railway tracks, would be of positive economic benefit improving efficiency for shipping activity. Public enjoyment of the water's edge would also be enhanced through better access, as well as through connected open spaces. It is important to note, however, that the THC's vision of the Waterfront does not include as much parkland and open space as the Royal Commission does. In addition, the recreation space tends to be active, and of the manicured variety.

Evaluation

Methodology

Use of the Goals Achievement Matrix was deemed the best way to overcome the conceptual nature of the plans evaluated, and concomitant lack of quantitative information. GAM is useful in this respect as it measures movements towards and away from particular goals, and can utilize qualitative changes and rank ordering. The goals incorporated were those selected by Watershed and Concept Plan as they both argue that their plan represents what kind of development the public feels is appropriate for the Waterfront.

The role of the different disciplinary experts was then to

evaluate the effect of both plans on all goals. However, it was left to the stakeholders - members of public interest groups, non-profit organizations, and governmental agencies - to weight them according to importance. In the spirit of this approach, the evaluation derived from an economic perspective can only be in a disaggregated form, indicating movement away from the relevant goals, impacted by economic processes and activities. The disciplinary approach also allowed the working group to harness the expertise of each expert by incorporating each perspective in the holistic analysis. This was accomplished using AEM. Each expert provided information to other subgroups, requested information inputs, and supplied a list of relevant indicators. This created linkages between the various subgroups, allowing incorporation of the concept of sustainable development as well as many diverse viewpoints.

The ranking used ranged from -3 to 0 to 3 with 3 measuring positive movement towards the indicated goal, and -3 the maximum movement away from the goal. Relevant economic indicators were used as ways to operationalize measurement.

Ranking of Criteria from the Economic Submodel

Indicator:	Plan:	
	THC	R C
Growth in employment:	3	2
Growth in income and profits:	3	2

1 GOAL OF ECONOMIC DEVELOPMENT

Economic growth resulting from the Toronto Harbour Commission's Concept Plan, as indicated earlier, is expected to be substantially higher than the Watershed proposal from the Royal Commission on the Future of Toronto's Waterfront, both in terms of employment, and in terms of economic growth for the East Bayfront/Port Industrial districts. This results partially from the THC's proposal to set more land aside for industrial parks, and also from the minimization of economic uncertainty in the area.

Indicator:	Plan	
	THC	RC
Sectoral Composition of light to heavy industry on the Waterfront:	2	3
Lorentz type analysis showing what percentage of users fall within what percentage of income:	1	3

2 DIVERSITY (ECONOMIC)

Economic diversity contributes to a stable local economy and is thus important from an economics perspective. The greater emphasis on light industry in Watershed affords it a higher mark towards the goal of economic diversity. It is seen to outweigh its nebulous commitment to heavy industry due to the high value added of the former. Diversity is also affected by the type of economic

activities planned. It is felt that the greater emphasis on user-charges in the planning of recreational activity, and the decision not to include affordable housing in the area, makes the THC plan less desirable in terms of economic diversity. There is, however, improvement over the base case. The new industrial parks will be in place for primarily second-generation industry, complementing the existing heavy industry.

Indicator:	Plan	
	THC	RC
Average emission levels/\$ output produced on the waterfront:	0	3
Meeting MOE standards on the level of contaminants present:	2	1
% change in green industry as a ratio to the Waterfront economy:	1	3

3 CLEAN/GREEN

The goals of Clean and green are important from an economic perspective in terms of sustainable development. The first two indicators recognize the fact that the level of industrial activity will influence in a cumulative manner meeting MOE standards for emission loadings in the area. The THC is ranked lower due to its higher level of economic activity envisioned. It is however,

perceived in practice, more able to accomplish soil remediation, and was awarded a higher mark for the second indicator.

Indicator:	Plan:	
	THC	RC
Change in the number of owners of waterfront property:	0	-2

4 STATUS QUO LAND OWNERSHIP

In terms of status quo land ownership, more owners were seen as negative, leading to less ability to plan comprehensively. The THC was given a higher score towards its goal, proposing to consolidate land ownership under its mandate, and minimizing economic uncertainty. It was felt that the Royal Commission's idea to withdraw the THC's mandate in favour of TEDCO would disrupt the economic environment and the existing business relationships created in the area.

Indicator:	Plan:	
	THC	RC
% change in shipping tonnage:	2	-2

5 ENHANCED PORT USE

The THC's Concept Plan suggests the reorganization of roads, shipping lanes, and railways which would improve the accessibility of the Port. This was coupled with expansion of port-related

industry and necessary infrastructure creation along the dock walls. The Royal Commission, it was felt, would discourage port use through the deemphasizing of heavy industry, and the statements to the effect that the Port suffers from excess capacity.

Indicator:	Plan:	
	THC	RC
Change in land values:	2	-1
Composite figure measuring average cost of a day's activity:	-2	-1

6 AFFORDABILITY

Land values must be stabilized to ensure affordability for industrial users. The Watershed report was seen as detrimental to this effect: the ambiguities may encourage speculation especially in the area to be managed by the Trust. Spillover effects to the whole district may occur due to the threats of rezoning. In addition it is felt that although the cost of using the Waterfront may go up, more users from all income groups will visit the Waterfront (number 2). The Waterfront will be deemed more competitive to Canada's Wonderland and other entertainment. In addition there is sufficient passive recreation to allow participation by all groups in free activity.

Indicator:	Plan:	
	THC	RC
\$ spent by waterfront industry on environmental R&D, and public education campaigns	0	3
7 INSTILLING ENVIRONMENTAL AWARENESS		

Note that environmental awareness is perceived by the author as being an exercise inseparable with economic development and of interest from an economics perspective. The proposals to turn the Waterfront into a centre for green activity obviously leads to more progression towards this goal.

Indicator:	Plan:	
	THC	RC
Growth of economic value of the sector:	3	2
% change in employment levels generated on the Waterfront derived from tourism:	1	2

8 TOURISM

The THC's Concept Plan will generate more revenue vis-a-vis tourism due to the emphasis on active recreation, coupled with a connected open space along the water's edge. However, it will be less labour-intensive than the Royal Commission's conceptualization. It is expected that the latter will encourage recreational activities involving more human interaction. Tours, and awareness days are examples of this labour intensive activity.

Conclusions

Caveats

The economic perspective has emphasized the need to minimize uncertainty in the planning process so as to stabilize land rents. This makes it possible for industry to continue to play an integral role in the future of the Waterfront. It is also recognized as essential to include the concept of sustainable development.

Recognizing that both plans are fairly compatible, it is thus

recommended that the THC's Concept Plan be adopted for the Port Industrial and East Bayfront districts with the following provisos:

1. that the teleport business park not be built, leaving the area at the base of the Leslie Street Spit as a contiguous urban wilderness. This is a recognition of the ecological significance that the area holds.
2. that the proposed business and industrial parks encourage the development of green industries. Also the creation of an environmental research centre would further R&D in the area.
3. that a time-line and costing implications for soil remediation be formulated, minimizing uncertainty.
4. that the THC and the industrial tenants form a committee to determine the best method for soil remediation in accordance with MOE criteria for industrial uses.
5. that a reevaluation of needed port facilities be undertaken so as to maximize the amount of land available for development.
6. that the THC continue in its role as port developer. Introduction of multiple agencies may lead to speculation in property values, discouraging comprehensive planning and development.

1. Gene Desfor (1990), Urban Waterfront Industry: Planning and Developing Green Enterprise for the 21st Century [Symposium Report], Royal Commission on the Future of the Toronto Waterfront, pp. 5.

2. In 1911, the city's press began to question whether heavy industry was germane to the Waterfront. For example, The Globe suggested that the presence of saw and steel mills would scar the character of the waterfront. The Telegram, on the other hand, worried that the downtown area would be filled with smoke. Even one of the Toronto Harbour Commissioners expressed concern, stating that industries emitting "a great deal of" smoke and gases would be prevented from locating in the Port area; see Persistence & Change - Issues of the Waterfront, Background Paper 4 (1989), Royal Commission on the Future of the Toronto Waterfront.

3. See Table 1 and Table 2 for a list of land uses and their possible implications for future uses.

4. See Figure 1.

5. See Figure 3.

6. Finding statistics for the GTA and the Waterfront is highly problematic due to their scarcity. Disaggregation tends to stop at the Provincial level, with Municipal statistics being inconsistent and sparse. To overcome this problem the author interpolated GDP statistics from Provincial numbers, using a population scaling factor. For example, in 1986, the GTA comprised 41% of Ontario's population base. Ontario's GDP for that year was then scaled by a factor of 0.41 to derive a rough estimate of the GDP of the GTA. This is recognized to be crude and a limitation in its use. Information sources include The Bell Report, The IBI Report and Municipal Financial Documents.

7. Policy and Economic Analysis Program (January 1990), National Projections to the Year 2011, University of Toronto. This study represents the most current projection completed and is favoured as its methodology utilizes a macroeconomic model which better is able to follow the movement of leading economic variables and their impacts on the economy as a whole. In addition, effects of Free Trade and the GST are incorporated. This lower growth scenario is also deemed relevant for the Toronto setting, as historical trends of national GDP have moved closely together with that of Ontario.

8. These goals were operationalized to mean the following:

CLEAN: Environmental medium free of contaminants, to permit fishing, swimming, and other recreational pursuits.

GREEN: restoration and maintenance of natural habitats, species diversity, ecological processes and

communities.

USEABLE: minimize land use conflicts, promote environmentally friendly industrial and recreational uses on a year round basis, and permit public access to the water.

DIVERSE: balance between different types of uses, and competing demands ie., free and user-pay activities, passive vs. active.

OPEN: water's edge should be open to public access and view should not be obstructed.

ACCESSIBLE: by all types of transportation, and by all types of individuals, including women or physically-disabled (to include safety considerations).

CONNECTED: Waterfront should be linked by trails, contiguous green corridors emphasizing connections to natural and cultural heritage.

AFFORDABLE: financially available to all groups, with emphasis on affordable housing.

ATTRACTIVE: landscaping providing a distinctive, memorable place, to consider the relationship between buildings, open spaces and water.

See The Royal Commission on the Future of the Toronto Waterfront (1990), Watershed, pp. 51-82.

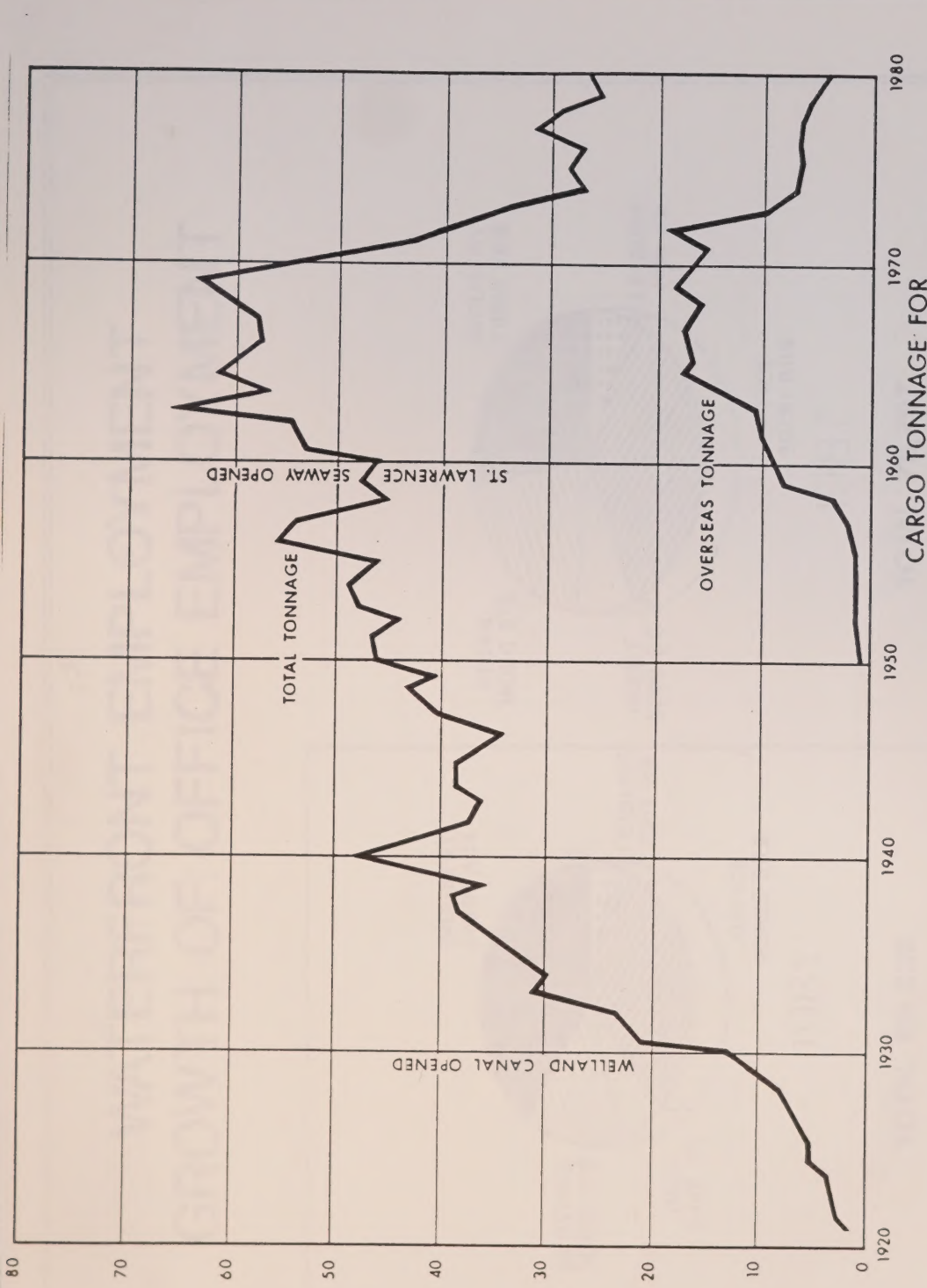
9.The Royal Commission on the Future of the Toronto Waterfront (1990), Watershed, pp. 144-145.

10.The following industries would be affected: Lake Ontario Cement, Sevensden Holdings Limited, Canada Cement , Lafarge Ltd, Delonn Limited, Rothsay Concentrates Co Limited, McColl-Frontenac Inc., Darling & Company Limited, Harkow Aggregates & Recycling Limited, Quebec and Ontario Recycling Ltd., Natale & Gueriere Containers Ltd, Oil Canada Limited, Toromont Industries Ltd, CP Express & Transport Company, Cooper's Iron & Metal Ltd. This is significant, as the area in question contains a large proportion of privately-owned land. Note also that Baines & David, and Victory Soya Mills have already announced their intention to relocate, perhaps in reaction to the uncertainty surrounding future development of their area; see Map 1 and 2.

11.G. Desfore (1990), Urban Waterfront Industry. Planning and Developing Green Industry for the Twenty-First Century, a Symposium Report, Royal Commission on the Future of the Toronto Waterfront, pp. 3.

12.A storage area for cement, aggregates and concrete may be located at the east end of the Ship Channel.

13.Toronto Harbour Commission (1988) Concept Plan: Discussion Paper.



* BASED ON DATA PROVIDED BY
THE TORONTO HARBOUR COMMISSIONERS

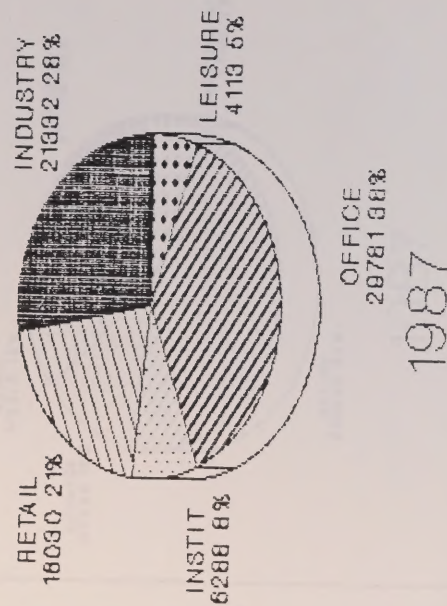
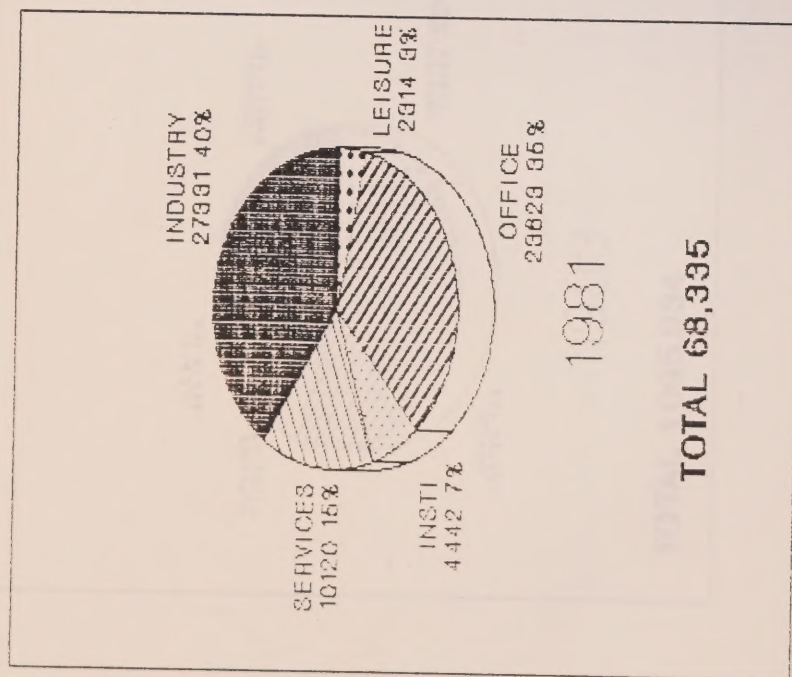
CARGO TONNAGE FOR THE PORT OF TORONTO 1920-1980

The Central Waterfront

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MARCH, 1982

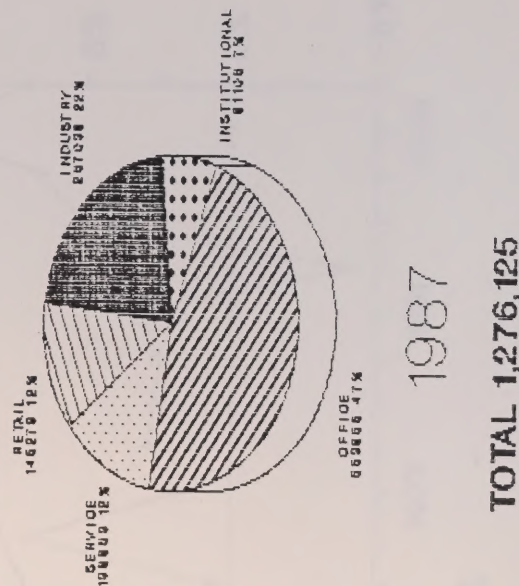
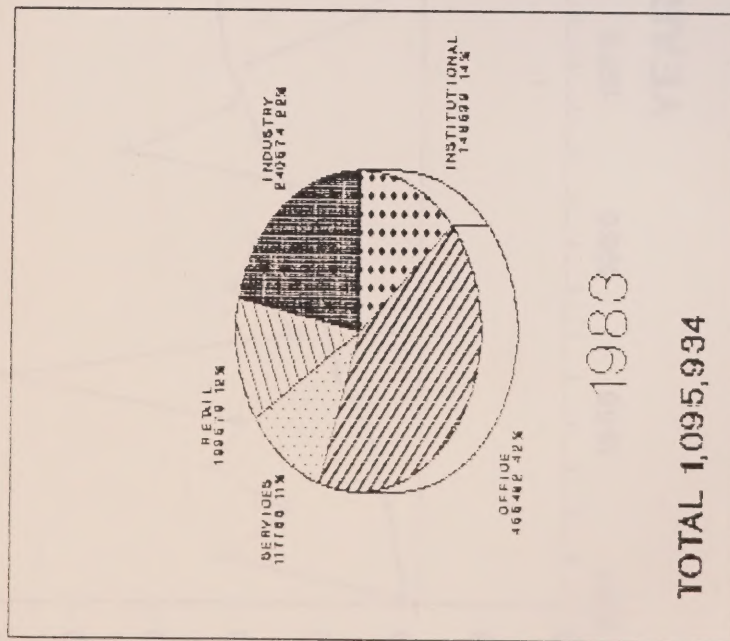
FIGURE 1

WATERFRONT EMPLOYMENT GROWTH OF OFFICE EMPLOYMENT



INDUSTRY-MANUFACTURING+TRANSPORT

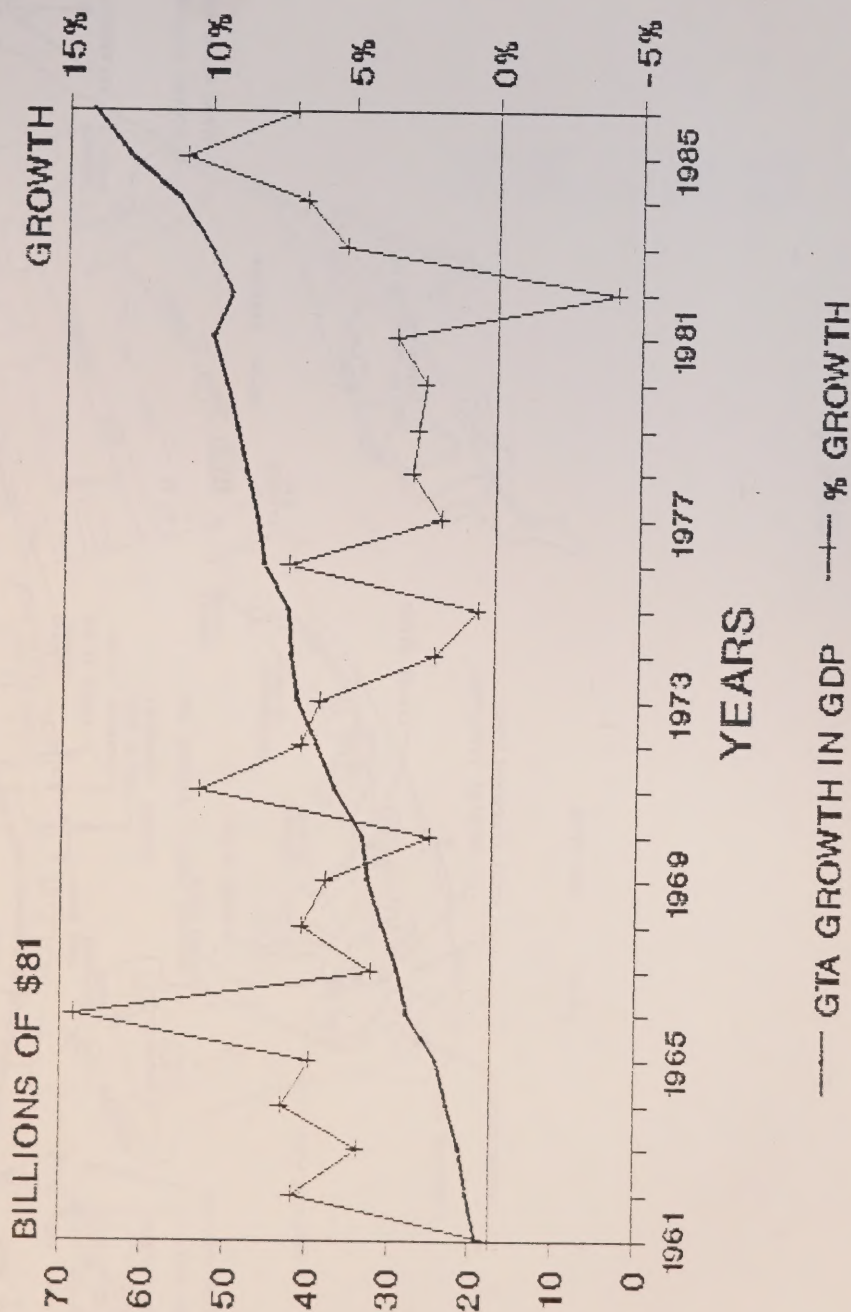
METRO EMPLOYMENT GROWTH IN OFFICE WORK

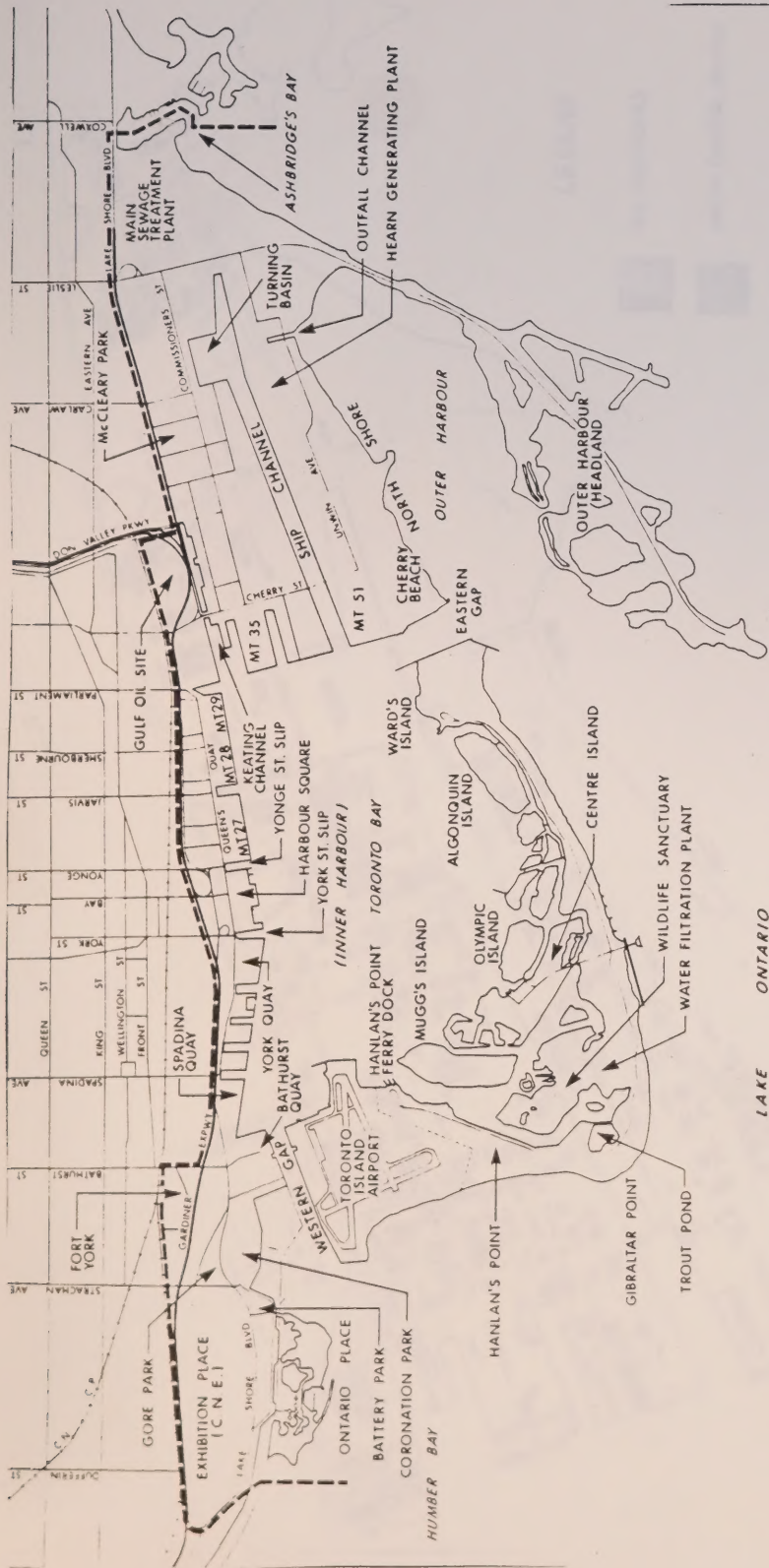


INDUSTRY-MANUFACTURING-TRANSPORTATION

FIGURE 3

GTA GDP ESTIMATES DERIVED FROM PROVINCIAL STATISTICS 1981-1986





LAKE ONTARIO

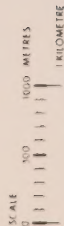
MAP 1:

ORIENTATION MAP

The Central Waterfront

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MARCH, 1982

pp 8





LEGEND



OIL REFINERIES



METAL/MINERAL PROCESS



THC LANDS - MTs



WASTE/RECYCLING/
UTILITY FACILITIES

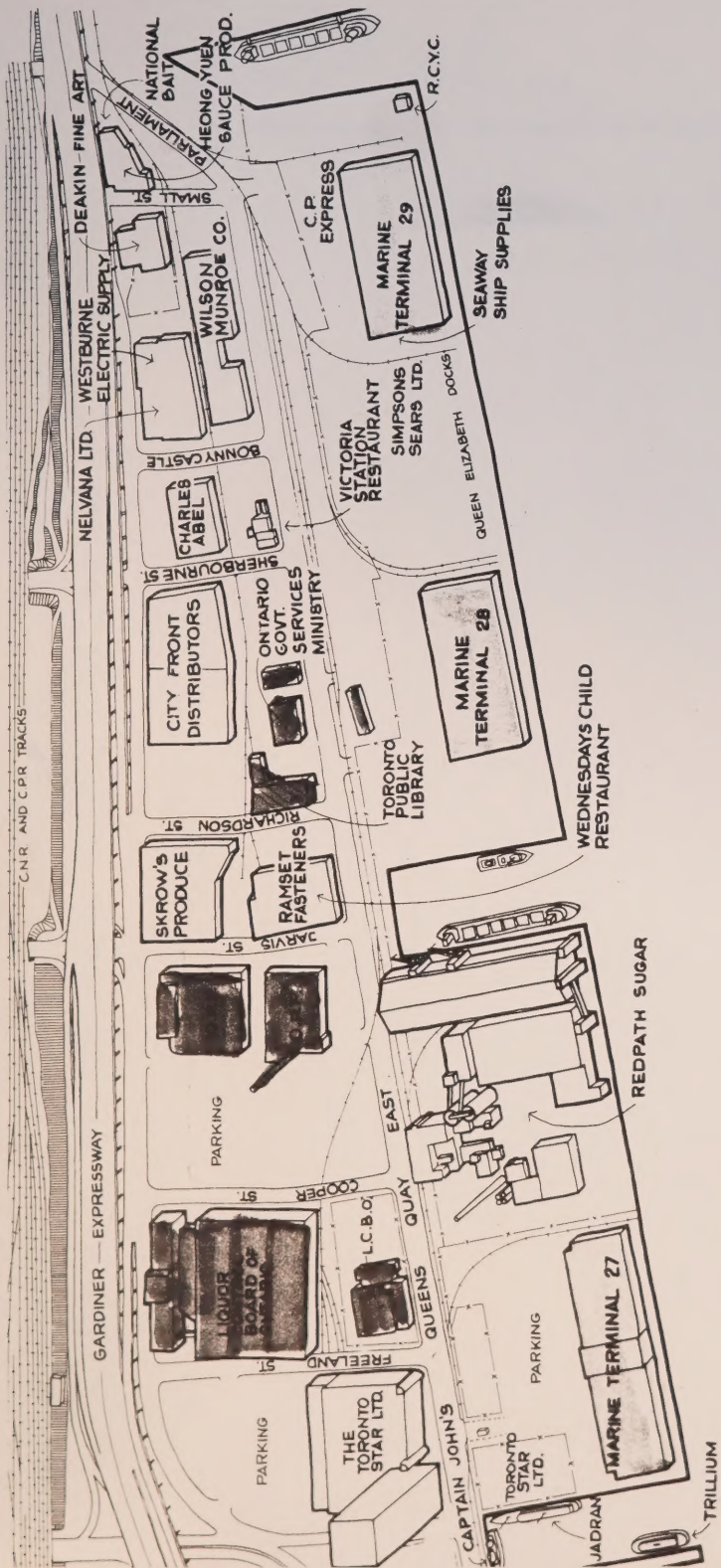


TRANSPORT & RETAIL

MAP 2A: TYPES OF ECONOMIC ACTIVITY
PORT INDUSTRIAL DISTRICT

The Central Waterfront 

CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MARCH, 1982



THE LANDS - MT

PROVINCIALY CONTROLLED LANDS

CITY LANDS

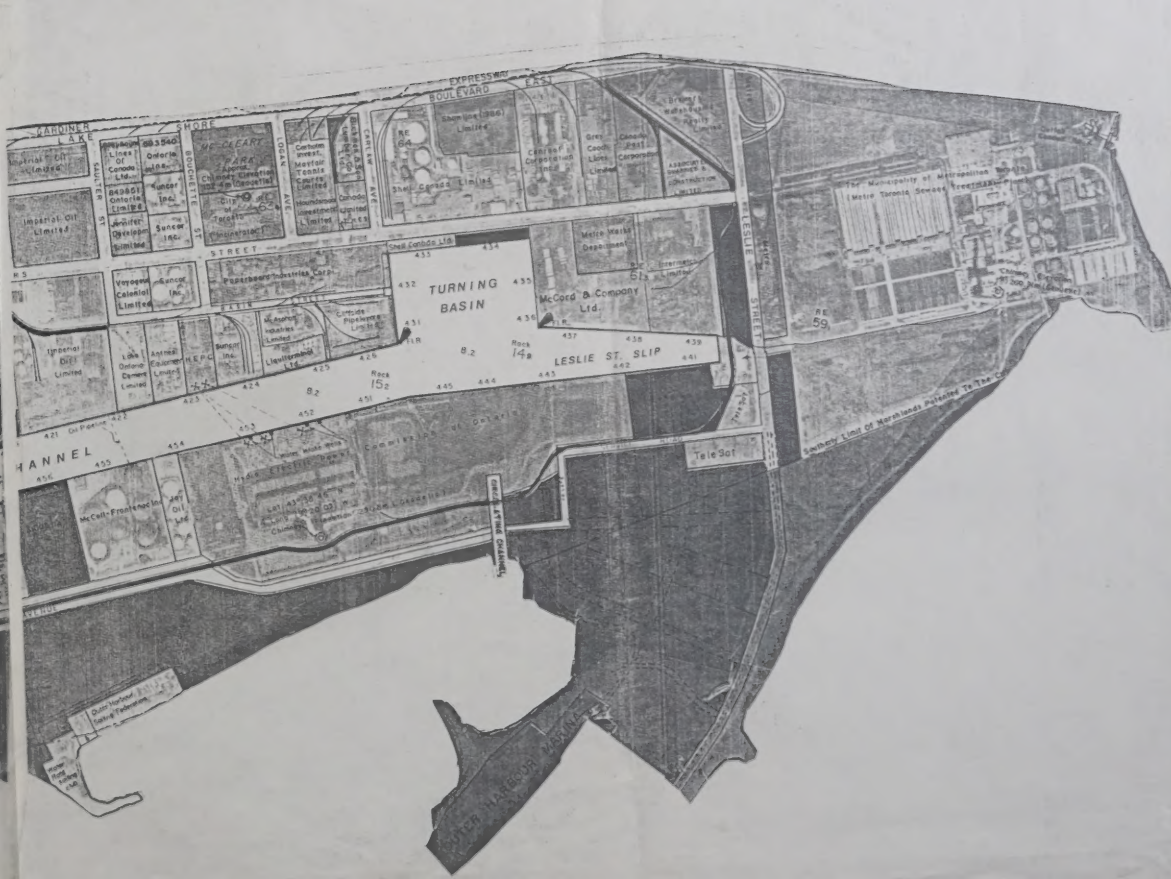
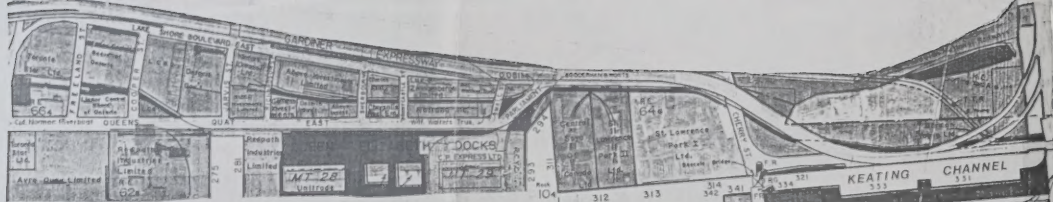
PROCESSING LAND USES

MAP 2A CONT: TYPES OF ECONOMIC LAND USES
EAST BAYFRONT

The Central Waterfront



CITY OF TORONTO PLANNING AND DEVELOPMENT DEPARTMENT MARCH, 1982



LEGEND

SYMBOLS & ABBREVIATIONS

- Position of Light
- Position of Spar Buoy
- Q Quick
- F Flashing
- F Fixed
- R Red
- G Green
- W White
- Bl Blue
- Y Yellow
- Or Orange
- B Black
- R.E. Rock Elevation
- SB Small Boat Pump-out Station
- D Metropolitan Toronto Police, Marine Unit

COLOUR

- LANDS FOR LEASE
- LANDS UTILIZED BY T.M.C.
- LANDS LEASED
- LANDS SOLD
- LANDS UNDER DEVELOPMENT BY T.M.C.
- PARKLANDS
- WATER SHALLOWER THAN 0.23 m.
- LANDS UTILIZED BY METROPOLITAN TORONTO POLICE

NOTES

THIS PLAN IS NOT INTENDED FOR NAVIGATION PURPOSES, SEE HYDROGRAPHIC CHARTS 2085, 2086 AND 2062

All soundings and rock bearings to water are shown in metres below chart datum (International Great Lakes Datum) and land rock bearings and elevations are referred to Canadian Geodetic Survey 74.907m U.S.L.D. = 74.312m Geodetic = 248.80 feet I.G.L.D.

Rock numbers are expressed in three digits adjacent to rock walls (i.e. 436)

Photograph taken April 1989 and revised to January 1st, 1990.

Approval pending re-bay numbering system

Shoreline shown at chart datum



Port Industrial Area Concept Plan

MAP 4

THIS IS CONCEPT PLAN
SOURCE: THE MAP



Table 1
Effects of Past Land Use on the Environment

	Number of sites	Effects
Petroleum Product storage	38	yes
Refining and Distribution	39	maybe
coal storage and distribution		
Primary metal industries and		
Fabricated metal products	23	yes
offices and retail/		
warehousing outlets	16	no
docking and trucking facilities	14	no
food processing, storage and		
distribution	10	no
chemical and building materials		
storage and distribution	10	maybe
metals recycling	10	yes
vacant land and parkland	10	no
tar distillation and		
briquetting plants	5	yes
miscellaneous	30	maybe

Table 2
List of Firms Locating in the Port Area, 1931

British-American Oil Company
McColl-Frontenac Oil Company
Imperial Oil Company
Sun Oil Company
Shell Oil Company
Dominion Boxboards
Canadian Paperboard
Victoria Paper & Twine
Hamilton Bridge Company
Bain & David Steel
Canadian Ice Company
Link-Belt Ltd
Canadian Patent Leather
W. Hamilton & Company
E. Fielding & Sons
The Canadian Coal Company
Dominion Tar and Chemicals Ltd
Warren Bituminous Saving Company
Canadian Cement Company

References

- City of Toronto Planning and Development Department (1982). The Central Waterfront: Proposals.
- Desfor, G. (1990). Urban Waterfront Industry: Planning and Developing Green Enterprise for the 21st Century [Symposium Report]. Canadian Waterfront Resource Centre
- Metro Toronto (1989). Municipal Financial Statistics
- Munn, T. (1988) Soil Remediation in the Port Industrial District. Canadian Waterfront Resource Centre.
- Policy and Economic Analysis Project (January 1990). National Projections Through 2013.
- Royal Commission on the Future of the Toronto Waterfront (1989). Economics, Jobs and Growth, Background Report 5.
-
- Persistence & Change: Waterfront Issues and the Board of Toronto Harbour Commissioners, Background Report 6.
-
- Waterfront Transportation in the Context of Regional Transportation, Background Report 9.
- Stamm Economic Research (1989). Toronto Regional Growth Study, Component 1.
- Toronto Harbour Commission (1988). Annual Report, 1988-1989.
-
- Discussion Paper: Concept Plan.

Social Impact Factors

Roslyn Moore

SOCIAL IMPACT FACTORS

Social impact research literature reveals some standard social impact indicators which may be derived from a contextual analysis of the type of human activity/project proposed and its likely effects on various aspects of society. (Finsterbusch, Llewellyn, Wolf, 1983; Beanlands, Duinker, 1982). For purposes of the Ecopact Environmental Impact Assessment of the Toronto Harbour Commission (THC) and Royal Commission Watershed proposals for the Toronto East Bayfront/Port Industrial Area the following factors have been selected:

Those factors considered to serve as indicators of **quality of life** include ;**Health,Safety,Housing,Employment,Recreation,and Aesthetics.**

Those factors considered to serve as indicators of **societal concerns for ecological health** include plant and animal species' relative importance for: **Commercial purposes,Recreational purposes, and Potential for being endangered or losing habitat.**

The ideal method for measuring impact categories would be that of **triangulation**; that is, using measures devised for three distinct categories of information including attitudinal, observational, and statistical data.(Finsterbusch,1983). In the absence of such data this discussion will necessarily be limited to what one might call **proxy predictions** - quite generalized comparisons of the two proposals based on educated and experienced outcome prediction.

Each of the social impact indicators for both the THC and the Watershed proposals will next be ranked on a scale of -3 to +3 where negative values reflect impact away from the direction of goal attainment, 0 reflects no impact, and positive values reflect impact in the direction of goal attainment for each of the foregoing thirteen goals. The indicators have been selected as objective or approximately objective measures of the nine

factors described above as generalized indicators of **quality of life** or **concerns re. ecological health**

1. <u>CLEAN</u> GOAL INDICATORS	THC	WATERSHED
- decrease in levels of contaminants in soil, air, water which impair use/habitation as per MOE standards for effluents and outflow monitoring	1	2
- adherence to Dept. of Health standards for drinking water and bathing beach openings; low fecal coliform bacteria counts.	1	2
- increase in # of open beaches	1	2
- increase in # of H2O recreation users	1	2
- increase in financial outlay toward soil decommissioning	2	1
- increase in # of aquatic indicators; decrease in # of fish with tumors or deformities; decrease in toxin levels in fish as per MNR standards; increase in # of fish suitable for consumption	1	2
- improved visual aesthetics; absence of garbage,oil ,grease, and algae on surface of land and water	1	2

Discussion:

Although the THC and Watershed proposals are somewhat similar, themajor difference involves the more optimal operationalizing of the terms "clean industry" in the Watershed report cf. the relatively unspecified nature of the supposed "light industry" proposed by the THC. Watershed suggests an analysis of all input, components, and processes; in contrast, we have no similar input from the THC re. the specifics of attention to the Clean goal from an industrial standpoint. Additionally, we understand the THC plan to include some maintenance of current industry. Some of these facilities, eg. cement production industry, may continue to contribute to air, water or land pollution.

On the other hand, the THC plan allows for expansion of port facilities in contrast to the Watershed goal of consolidating (decreasing) port use facilities; if the THC is successful, we may experience a reduction in highway transport traffic, and a consequent reduction in vehicular exhaust pollution.

Thus, the costs to society of either plan must be weighed against their proposed benefits when considering the Clean goal attainment. In general, as seen above, Watershed attains higher scores for this particular goal.

2. <u>GREEN</u> GOAL INDICATORS	THC	WATERSHED
- increase in natural vegetation, eg.		
# of trees planted 2	2	
- maintenance of wildspace, natural habitat, sensitive areas 2	3	
- increase in species diversity 2	3	
- increase in indicator species 2	2	
Discussion:		

Comparing the Watershed vs. the THC on these dimensions is somewhat more straightforward. That is, Watershed proposes greater areas of the port acreage as park area and wildlife corridor cf. the THC plan. Although both plans consider expansion of Cherry Beach as such an exercise, the Watershed plan appears to consider the Beach in the broader context of the "waterfront promenade"; the THC plan does not envision expansion in this way, but rather looks at developing more retail trades or tourist industry in the port area.

On the other hand, there are certain costs to society associated with, for example, "greening of the Don Valley corridor". In response to this issue, the Metro Commissioner of Planning notes that issues regarding its size and location require further study and relate directly to other projects, such as Ataratiri; he states "the area designated for a connecting link by the Royal Commission may be too restrictive to resolve this issue." (Response to Metro Waterfront Committee, John A. Gartner, Commissioner of Planning, Oct. 2, 1990).

Additionally, the process of attaining the Green goal will be dependent on the timing and success of soil decommissioning. To date, the THC appears to have developed more specific, realistic goals regarding decommissioning cf. Watershed.

On balance then, we would view the THC plan and the Watershed plan as roughly comparable in terms of attainment of the Green goal.

3. <u>USEABLE</u> GOAL INDICATORS	THC	WATERSHED
-----------------------------------	-----	-----------

- Increase in # of public parks	2	3
- Increase in # of clean,safe beaches ...	2	3
- presence of wheelchair access ramps ..	2	3
- increase in water-related uses	2	3
- public accessing port area via public transit	2	2
- ease of access by seniors,children, parents with baby equipment	2	3
- increase # of bike,foot paths	2	3

Discussion:

We would predict that Watershed plans for a waterfront promenade, together with more acreage devoted to park space and public docking would compare favourably to the THC plans on this dimension. The THC plan, however, does provide for water-related uses such as water taxi, and water ferry; on balance, though, the THC plan falls somewhat short of Watershed on attainment of the

Useable goal.

4. <u>DIVERSE GOAL INDICATORS</u>	THC	WATERSHED
- provision of diverse experiences for public, including urban and rural uses,public and private, active and passive, free and user pay	1	2

Discussion:

Again, comparing the amount of green/park space between the Watershed plan and the THC plan for the port area, one might conclude that Watershed will provide the greater diversity for human use cf. the THC plan .

5. <u>OPEN GOAL INDICATORS</u>	THC	WATERSHED
- Increase in open/green space.....	1	3
- accessibility of shoreline to public..	1	3

Discussion:

The Watershed plan is clearly superior to the THC plan in providing for a visually pleasing and accessibly open panorama of the waterfront. The THC plan for port use expansion unfortunately jeopardizes attainment of this goal.

6. INCREASE ENVIRONMENTAL AWARENES

GOAL INDICATORS	THC	WATERSHED
- Provision of educative resources	0	3
- # of people attending seminars, training sessions re. environmental issues	0	3
- # businesses involved in "green" or conservation activities	1	3

Discussion:

There is no provision for this goal in the THC plan; thus, based on a comparison of the Watershed proposed green industry enterprise with the THC proposed light industry, Watershed attains highest score on this dimension.

7. <u>CONNECTED</u> GOAL INDICATORS	THC	WATERSHED
- # of miles of connected bike and foot paths	1	3
- continuity of wildlife corridors	1	3

Discussion:

The Watershed plan, again, is clearly superior to the THC plan in conceptualizing both human and wildlife relatedness via inter-connected bicycle and foot paths, together with wildlife corridors which sometimes merge and also remain independent of each other.

8. <u>AFFORDABLE</u> GOAL INDICATORS	THC	WATERSHED
- Accessibility of waterfront to all income groups	3	3
- Increase in taxes/costs to society re. land use and land remediation	1	-2

Discussion:

There are significant tax increases and costs to society inherent in the Watershed plan cf. the THC plan, which relies heavily on the private sector and retail business for debt balancing. This factor is, perhaps, modifiable but at present, we would predict higher goal attainment re. affordability by the THC plan.

9. <u>ATTRACTIVE</u> GOAL INDICATORS	THC	WATERSHED
- Balance of natural and built heritage ...	1	3
- Post-project measures of user perception re. aesthetics	1	3

Discussion:

Again, because of the predominance of built heritage/industry inherent in the THC model, we would

assign a higher rating to the Watershed plan. Watershed embodies the attempt to balance nature and the built environment. Additionally, other measures, such as the factor of open shoreline contribute to this dimension.

10. <u>ENHANCE PORT USE</u> GOAL INDICATORS	THC	WATERSHED
- Increase in # of water-related transport activities	3	1
- Accessibility of shoreline to commercial and recreational vessels	2	3

Discussion:

As described earlier, the THC plan promotes greater use of the port area for lake transport vessels; while both plans include use of the area for water-based recreation or commercial use, the THC moves closer to goal attainment.

11. <u>ECONOMIC DEVELOPMENT</u> GOAL INDICATORS	THC	WATERSHED
- Increase in # of jobs	3	2
- Increase in standard of living for area population	0	0

Discussion:

The THC plan incorporates a greater number of retail businesses which will probably provide more employment for local population; however, the increase in # of jobs may not necessarily affect the standard of living/quality of life of those individuals.

12. <u>TOURISM</u> GOAL INDICATORS	THC	WATERSHED
- Increase in # of tourists utilizing area	1	2
- Increase in tourism -related business	1	1

Discussion:

The Watershed plan and the THC plan are probably roughly equivalent re. their capacity to draw tourists, with Watershed coming out ahead because of greater waterfront accessibility.

13. <u>STATUS QUO OWNERSHIP</u> GOAL INDICATORS	THC	WATERSHED
- Maintenance of current ownership privileges and legal/financial relationships	2	-2

Discussion:

The THC plan most closely embodies the principles of status quo ownership while the Watershed plan promotes sweeping changes in the legal/financial basis of the operation by involving the TEDCO corporation and the municipal government.

REFERENCES

Beanlands, G.E. and Duinker, P.N. An Ecological Framework for Environmental Impact Assessment in Canada. Ottawa:FEARO,1983

Finsterbusch, K; Llewellyn ,L.G.; Wolf,C.P. Social Impact Assessment Methods Sage Publications, 1983

Maclaren, V. and Whitney, J. New Directions in Environmental Impact Assessment Ottawa, 1988

Report to Metropolitan Waterfront Committee from Commissioner of Planning , Metropolitan Comment on Watershed, Oct. 1990

THC Concept Plan

WATERSHED, Interim Report , August, 1990*

Political Institutions

Dave Alexander

**The Political Institution Component Group
of the
Human Activity Sub-model**

Introduction

The method selected to determine the most appropriate proposal for the Toronto Port Industrial Area, must be as objective and unambiguous as possible. The political institutions involved in this process hold the power to make the final decision and implement the selected plan. With two similar and yet conflicting visions of the future development of the Port Industrial Area, the political system must serve the people in objectively arbitrating and choosing the most appropriate proposal. Therefore, it makes a great deal of sense to remove the political institutions from influencing the indicators and optimization of the GAM decision-making tool. This approach is in keeping with an ecosystem belief of utilising the principles of sustainable development.

Public accessibility

From a sustainable development perspective, the political institutions must provide other component groups in the GAM model with full support and information in order to develop the optimum indicators of their selected goals. The political institutions can also provide guidelines, expertise, monitoring and meeting facilitation to assist in determining the most appropriate direction for the future of the community. Access to the

evaluation process is gained by the public by three methods:

Stakeholder involvement;
Elections of community representatives; and,
Litigation by using the laws of the community.

The political institutions are driven by a bureaucracy, represented by politicians, and driven by a planning process, at all levels of government (Figure C6.1). Stakeholder access is through various mechanisms, focused into a lobby on policy and planning. In turn, a directive, in the form of a new goal or objective, attempts to mitigate the pressures that request social and environmental change. The courts, through litigation and legislation produce

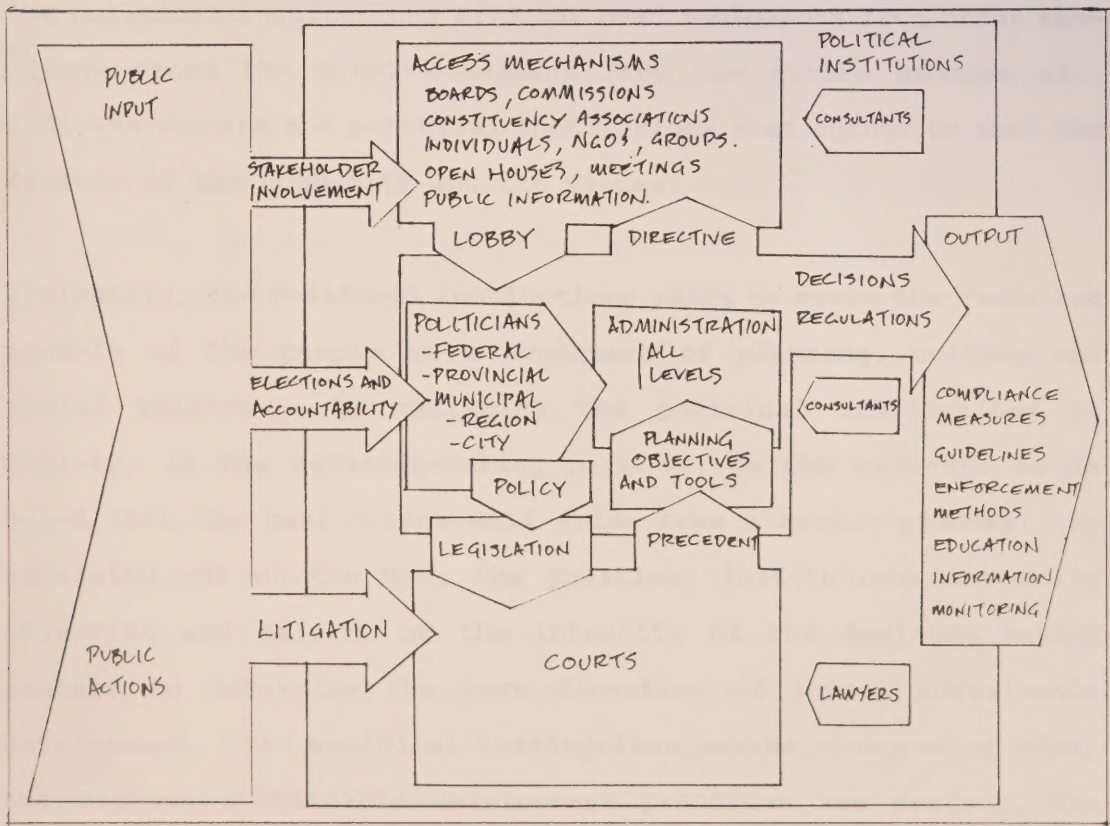


Figure C6.1: Political Institutions Public Input-Output

precedents and protocols that evolve the planning tools of a society. The process output decisions and regulations mechanisms, in the form of compliance measures, guidelines, monitoring, and enforcement, represent the methods in which a community is using to approach an ideal of what it wants to become. This process is iterative and responsive to the members of the community that want to actively develop a vision of their society.

By utilising the public institutions and working with the political process, the community reaches a point where appropriate decisions and regulations are enacted. Sustainable development suggests that the political institutions will not need indicators from other sub-groups since the final consensus from the entire process will indicate why and how political institutions must change to meet the demands of the community and its values.

Ultimately, the political institutions exist to serve the needs and mandate of the people as a benchmark of planning, culture and social welfare. By excluding the political institutions of society, in the decision-making part of the GAM process, it is hoped that the best choice will arise from a better process. By remaining out of the GAM, the political institutions are being objective and relying on the integrity of the decision making process to determine the best direction of future sustainable development. The political institutions assume a degree of risk, but because sustainable development practices are desired, the reasoning for excluding the political institutions is all the more

desirable. In weighing two planning approaches, the political institutions are seeking out the best possible equity effect of further actions to design the most effective system.

Political Institution Directions

None of the thirteen indicators developed for the GAM were able to accurately measure or represent a relative separation of the proposals in a political institution framework. Indicators like clean and green are more suitable for indicating ecosystem health for other component groups. Because both plans are in the early stages of development, the separation of the apparent differences and lack of detail and refinement do not allow for an equitable judgement on whether one plan is more useable or diverse. Similarly, the plans are too general to assess connectedness, openness, accessibility and attractiveness, from a public institution perspective; however, each plan is aiming for the proper proportion of all these goals.

Each proposal, uses their own conceptualization to interpret the use of the port, economic development and strategies to attract tourists using a set of rigorous justification criteria. The factor that can be compared using the economic component group is maintaining a status quo ownership in the port area. The mitigating factor is what plan has the correct balance of sustainable development. The other component groups of the GAM will determine this optimum equilibrium.

Many factors will contribute to the development of the area but a different affordability will attract a certain range of clientele. Detailed financial figures are not attached to both proposals, but the THC, as the principle developer, is prepared to proceed with its plan at no cost to the taxpayer, but with no public accountability. The RCFTW report will have full public disclosure, but no cost estimates and calculations. The RCFTW contends that their plan is economically feasible (and any uncertainty will be borne by the taxpayer). Sustainable development protocol necessitates open accountability as an important requirement.

Preferences could be clearly marked where one level of government would reap taxes and land development authority from one of the two proposals. This type of posturing leads to the reinforcement of excluding the political institutions from the GAM since it pits stakeholders against each other in the support of one or the other plan. Furthermore, since political institutions are stakeholders in this process, and by seeing a difference in derived future benefits in the two proposals, they would support one or the other proposal, depending on which one they stood the most to gain. This avoids a double counting effect in the GAM model where the THC and RCFTW proposals, as stakeholders, already weight the goals.

After the information from GAM has been tallied, the political institutions have the greatest access to the sustainable development. Consequently, by instituting independence from the goal side of the GAM, political institutions and their policy

makers can be issued a guideline essentially making them accountable to the community and to the objectives and vision of the winning proposal. A potential conflict arises since our political institutions use a majority representation system and the GAM expresses a proportional representation where minority views have validity and real weight.

Community ideas, growth and trends start in the minority and move into the mainstream. By political institutions following the majority opinion, society deals with its most glaring problems, but does not have the foresight to use new solutions and ideas that are available in the fringes. The mandates given to the politicians reflect the majority values and beliefs of a society at the time of the election and do not give them a firm "referendum" endorsement, per issue, to make choices for future generations of stakeholders.

One of the most important parts of the planning process is to have a better public perception in the community than other competing bids. The RCFTW has an excellent public communications program that gets more coverage than the THC proposal. This effect creates the perception that the THC proposal is less accountable and acceptable than the RCFTW.

Political Institution Leadership

Traditional approaches to public processes involve a justification mechanism that applies a process to a proponent. In sustainable development assessments, the proponent has to reason why they

should not be part of the process. Also, the needs of the future users must be met before the alternatives of the present users proceed. From this, sustainable development fits into the GAM way of thinking because it represents an ideal that is approachable by meeting objectives from using policy.

Comparatively, for example, both proposals will have to face the reality of land and water sediment remediation. The political institutions should enforce mandatory clean-up by polluters as well as working jointly with the Don River watershed clean-up. Although both proposals are not at the same stage of design, they are in fact quite similar so their predicted changes to future development and effect on the GAM criteria will also be similar. Both will face similar problems if not the same problem like contamination. Not only will soil have to meet acceptable 1990 MoE standards, but to the projected levels of what our future sustainable planned society is thought to demand.

The GAM maximizes the horizon of potential alternatives from estimates based on current trends. The accuracy and reliability of these figures would give a greater temporal perception in the planning of future usages.

In order to meet an implementation timeframe, both plans would have to maintain a roster of current users (an important source of revenue), and be accommodating when managing transitions to new locations in the port area. By creating an exponential demand for

prime, refurbished real estate, the available area is restricted because land under reconditioning is not in use.

Where the political systems provide support and information, they also restrict the process with regulations that need renovation to meet sustainable development criteria and thinking. In selecting one report over another, some aspects from the losing bid are superior to the winning bid. This is contrary to using the GAM in the sustainable development sense, rather it would build a best alternative based on maximized alternatives and complimentary effects in the GAM. Ideally, in fairness to future generations, the best possible decision should be made.

Conclusions

As the community values change, the equilibrium of preference of the proposals change. Sustainable development is the yardstick used to measure this change. These plans are intended to cope with our economic need and sense of urgency, and yet remain sensitive to the balance of the ecosystem. Hopefully, some future modification of the GAM can include the political institutions, to give a more accurate evaluation. By excluding the political institutions from influencing the selection of the THC or RCFTW proposal, this proportion and fairness assisted the GAM to become a more objective in selecting the pathway of future sustainable development.

Recreation

Geordy Meadows

Introduction

During the season

An Analysis of the Environmental Impact of Recreational Activities as a Component Part of the Human Activity Sub-group.

A. Introduction

This section of the report is an analysis of the environmental impact of recreational activities stemming from **proposed** land use changes on the Toronto waterfront. The specific area of concern is the East Bayfront/Port Industrial Area. The analysis will involve the assessment of two recent proposals for land use change as set forth by the Toronto Harbour Commissioners (THC) and The Royal Commission on the Future of the Toronto Waterfront (RCFTW).¹ This section of the report aims to assess the overall environmental impact of recreational activities (and their attending requirements) likely to result from the implementation of land use changes as brought about through one of the above proposals. As such, the impact analysis will conclude in an evaluation as to the favoured proposal in relation to the criteria that have been previously established. In addition, recommendations will be provided of ways in which the favoured proposal could more closely reflect the principles of sustainable development.

¹. It should be noted that while the THC proposal (EB/PICP) deals specifically with the East Bayfront/Port Industrial Area, the RCFTW's report Watershed is much broader in scope. As such, the report will be bounded in so far that only the factors affecting the area of concern will be included from the Royal Commission's report. This will in some ways help to "level the playing field", and provide for a more equitable analysis.

The Guiding Principle of Sustainable Development

It should be noted that all stages of this report, from the generation of goals through to the evaluation and recommendation stage, are firmly grounded (have been undertaken) within the context of adhering to and furthering the principles of sustainable development. Due to the relatively ambiguous nature of the term "sustainable development", and acknowledging the variability of possible interpretations, a working definition has been established as a reference point throughout the entirety of this report, and appears in the introduction. As concerns the recreation component within the Human Activity submodel, sustainable development may be recognized as:

the minimization of adverse impacts on both the natural and built environment while providing for (or fostering) the equitable and sustainable recreational use of facilities by all.

This definition is used as a measure of success in assessing to what degree the two proposals are moving towards the desired goals.

B. THE TWO PROPOSALS

The Royal Commission on the Future of the Toronto Waterfront

A general introduction to the Commission, its mandate, and the proposed plans has been provided in the Background section (2.0) of this document.

The impact analysis of the Commission's proposal is based on Watershed, the Interim Report which was released in August, 1990.

Although the RCFTW includes proposals and recommendations for the entire Waterfront region, specific details pertaining to the East Bayfront/Port Industrial Area are included. What follows is a brief overview of those proposals which are seen to affect human recreation.

- Port activities are to be consolidated in the Port Industrial Area, freeing up valuable lands for other uses. Significant among these is the opportunity to create major new parklands along the central waterfront.

- A continuous waterfront promenade should be established along the entire East Bayfront and Port Industrial Area.

- Cherry Beach should be expanded to comprise more than 200 acres.

- The Outer Harbour Marina should be conveyed to the city, limited to the existing 400 slips, and developed as a waterfront park.

Related Proposals

- The creation of a new waterfront industrial park is proposed for the East Bayfront/Port Industrial Area based on environmentally friendly and/or environment related "new industry". The degree to which this type of development creates externalities (in the form of air, water, soil, noise, or visual pollution) could have major impacts on recreational activities and subsequently upon the surrounding environment.

- The creation of the Toronto Waterfront Regeneration Land Trust, whereby the regeneration and use of currently vacant,

unattractive, under-utilized and contaminated lands would be converted to "productive" lands, could have significant implications for recreational opportunities in the study area.

- The development of a comprehensive clean-up plan (assuming successful implementation) for the Don River again has significant implications for water related recreational activities along this portion of the Toronto waterfront.

The Toronto Harbour Commissioners

The area of concern for the purposes of this study is port based. Consequently the THC is by-and-large the current authoritative body within the Port Industrial Area. As such, the THC have developed the Port Industrial Area Concept Plan (March 1988) as a site specific set of proposals. As with the RCFTW proposal, an overview of the THC, their mandate, and the proposed concept plan is included in the Background section (2.0) of this study.

A brief outline of those proposals seen to be particularly relevant or causing potential impact with the context of recreational activity is as follows:

- A redefined and consolidated Port Area, freeing up lands for other opportunities including recreational activities.

- The relocation of Port Area roads and rail alignments to improve circulation, integration with the City, and public perception of the area.

- The public's enjoyment of the water and the water's edge is to be increased through the creation of a network of open

spaces, parks, and water recreation areas, totalling over 200 acres. This open space network will also strengthen the Port Area's ties with the City and other waterfront amenities. Cherry Beach is to be enlarged and linked to Tommy Thompson Park and the Outer Harbour marina by the development of the Cherry Beach Waterfront Park, including the expanded use of associated water lots for recreational purposes.

C. GOALS

The RCFTW provides a list of nine guiding principles or goals (based on the ecosystem approach) which are to provide the basis for the proposed plans and recommendations. The THC has listed three primary objectives directing their concept plan. Both of these have been provided in their respective sections within the Background section (2.0). For the purposes of this study these goals have been consolidated into a single list of 13 goals against which the various components of each concept plan are to be judged within the context of sustainable development.

Since the recreation component comprises such a large and interdisciplinary area within the Human Activity sub-model, 11 of these 13 goals are taken here to be either directly or indirectly relevant to this portion of the study.

- | | |
|--------------------------|--------------------------|
| 1) Clean | 7) Connected |
| 2) Green | 8) Affordable |
| 3) Useable | 9) Attractive |
| 4) Diverse | 10) Attract Tourists |
| 5) Open | 11) Economic Development |
| 6) Foster Env. Awareness | |

D. CRITERIA AS INDICATORS

A set of criteria has been established to be utilized in the operationalization of the goals/objectives in terms of recreational activities. These will be used for the purposes of evaluating the relative achievement towards, or maximization of each of the goals with reference to the component under review. These criteria act as specific indicators which effectively measure the degree to which the relevant goals are being met or effected i.e., whether or not the given proposal is moving towards or away from the desired goals? These criteria have been utilized in the Impact Analysis stage (5.0) of the assessment in order to determine the overall impact of the proposal. It should be pointed out that the values applied to these indicators/criteria are not based upon empirical research and serve only to evaluate the concept of the two proposed plans in comparison to one another.

E. IMPACT ANALYSIS

The specific criteria chosen as indicators are provided as a means to measure goals achievement. Each will be briefly described and subsequently assigned an impact value from -3 to 0 to +3 where 0 indicates no net change from existing baseline conditions induced by the project. The negative values (-3,-2,-1) indicate a relative negative change away from the given goal and the positive values (+1,+2,+3) indicate a relative positive change towards goal achievement. For reasons of clarity and brevity this analysis is carried out in tabular form as follows.

Figure #1

GOAL	CRITERIA	RC	THC
Clean	● soil remediation to within Provincial guidelines ● air quality for recreational activities ● water quality for recreational activities ● decrease in # of polluting industries	0 +2 +2 +2	+2 0 -1 -1
Green	● increasing percentage of open spaces or parkland ● protect and restore ecological communities for fishing, birding, naturalists ● amount of "industry" present	+3 +2 +1	+1 0 -1
Useable	● actions that permit public access, use, and enjoyment of the water's edge ● promotion of greater year round use ● amenable to minority/disability use	+3 +2 +1	+1 0 0
Diverse	● provide diverse experiences for visitors ● activities other than sport-like i.e. galleries, info booths, history ● intensification of port and industrial use	+3 +2 0	0 0 -1
Open	● density and design that does not create visual barriers ● increase in "open" spaces ● creation of "openness" of views	+1 +2 +1	+1 +1 +1
Foster Env. Awareness	● public education ● adopt/based on green strategy ● environmentally friendly business activity ● providing contact with "nature"	+2 +3 +3 +2	0 +1 +1 0
Connected	● continuous "trail" systems ● green corridors ● planning emphasizing connectedness to natural and cultural heritage ● connected in the sense of access to facilities	+3 +1 +2 +1	+1 0 +1 0
Affordable	● economically balanced programming i.e. inclusion of all socio-economic groups ● creation of low-cost or free activities	+2 +2	-1 +1
Attractive	● protect vistas and views of the lake ● increased green space/scenery ● decrease in industrial base ● safety	+1 +2 +1 +1	+1 +1 -2 -1
Attract Tourists	● development of desirable passive and active activities/events ● inclusion of attractive "open spaces"	+3 +3	+1 +1
Economic Dev't	● recreational activities providing jobs and capable of generating capital so as not to be a burden to tax payers	+2	+2

E. Evaluation

As mentioned in Section D, impact values have been attributed to the various indicators providing a statement of relative impact (between the two proposals) for each of the established goals. A simple summation of impact values (rather than a weighted format²) has been carried out in order to arrive at an overall impact assessment for each of the two proposals as they concern the recreational activity submodel.

The following table provides the total impact values for each of the goals as well as for each of the overall proposals.

Table E₁

GOAL	IMPACT VALUE	
	RCFTW	THC
1) Clean	6	0
2) Green	6	0
3) Useable	6	1
4) Diverse	5	-1
5) Open	4	3
6) Foster Envir. Aware.	10	2
7) Connected	7	2
8) Affordable	4	0
9) Attractive	5	-1
10) Attract Tourists	6	2
11) Econ. Development	2	2
	61	11

Again, these values do not represent a measure of anything per se but are simply indicative of the assessed impact (as far as goals achievement is concerned) of each proposal relative to the other in accordance to the established goals.

² A more robust method of summation has been utilized in the Goals Achievement Matrix (Section 5.0) of this report which attempts to account for the different "weights" or importance ascribed to the various goals. This "ranking" of goals was previously determined by the various stakeholder groups involved. For a more detailed discussion of this portion of the study consult Section 5.0.

Stemming from this analysis, it is quite clear (from Table E₁) that the RCFTW proposal ranks as the favoured concept plan within the context of the recreational component. With an overall score of 61 as compared to 11, the RC proposal outscored that of the THC in assessed level of goals achievement in all but one category (in which they were tied). Using the four most highly weighted goals as determined by the various stakeholder groups involved in this particular E.A. (determined in Section 5.0 of the E.A. document as Clean, Green, Useable and Attractive) the RCFTW concept plan scores 23 as compared to a score of 0 for the THC concept plan.

What this impact analysis shows is that the RCFTW concept plan is overwhelmingly better suited to the achievement of the particular goals within the context of human recreational activity. The assessed scores point not only to the wide divergence in goals achievement between the two proposals but also to the relatively major net positive impact upon recreational activities that the RCFTW proposal is seen to have in comparison with the relatively minor net effect of the THC proposal. When desegregated into the 13 individual goals, the THC proposal in many important instances (Clean, Green, Useable) is seen to have little or no impact at all.

F. LIMITATIONS TO THE STUDY

While this analysis clearly indicates favouring the RCFTW proposal, it must be noted that the THC proposal is essentially "limited" in many regards from the outset. Firstly, the THC mandate clearly states that they are dedicated to maintaining and

the need for additional information if truly sustainable forms of development are to be adopted and implemented.

The following is a list of recommendations which could be used in a further assessment of these concept plans or in the evaluation of the final plans for the Port Industrial Area:

- 1) There is a need to compile an inventory of the **baseline** conditions of the existing facilities potential for recreational activity within the study area.
- 2) A detailed public opinion survey should be carried out in order to determine the needs and desires of both the general public as well as specific user groups (i.e. cyclists, boaters, naturalists). This would help to determine how resources might be allocated most **effectively**.
- 3) There needs to be further study and more information provided as to the current status of soil quality in the Port Industrial Area. Furthermore, sound and explicit estimates of both the feasibility and costs of remediation (up to adequate standards - see biotic component of the study) must be included for an adequate assessment concerning recreation to be carried out. Quite clearly the sustainability of recreation will be determined in large part by the health of the land base which supports such activities. Of primary importance is the issue of human health and safety, with additional concern for function and aesthetics.
- 4) The ecosystem approach dictates that the Port Industrial Area must be considered within the context of the entire

waterfront region. As such, recreational activities in and around the study area will be greatly effected by the local water quality of Lake Ontario. A comprehensive clean-up of the Don River Watershed is therefore an urgent priority.

5) Although the RCFTW concept plan is the favoured proposal within the context of this analysis, it remains difficult to **truly** assess the sustainability of proposed development plans in light of the related issue of the equitable distribution of costs and benefits. Therefore, a detailed and comprehensive estimation of the following details should be provided.

- a) a budget for the proposed plans describing how the necessary funds will be provided (i.e. what will be the estimated cost to taxpayers).
- b) some form of time-line for development whereby a structure is provided for proposed plan implementation.
- c) a prioritization of development plans, or at very least, a set of criteria by which priorities are to be set.

With these provisions, the decision choice could be more appropriately determined based on the realities of budgetary constraints, the allocation of scarce resources, development restrictions, etc., in conjunction with sound environmental principles based on the concept of sustainable development.

CA20NEV 90T56

Ontario. MOE.

TORONTO PORT INDUSTRIAL AREA ENVIRONMENTAL ASSESSM
STUDY. / Ecopact Assessment Ltd. 1990.

**RESOURCE CENTRE
INST. FOR ENVIRON'L. STUDIES
UNIVERSITY OF TORONTO**



